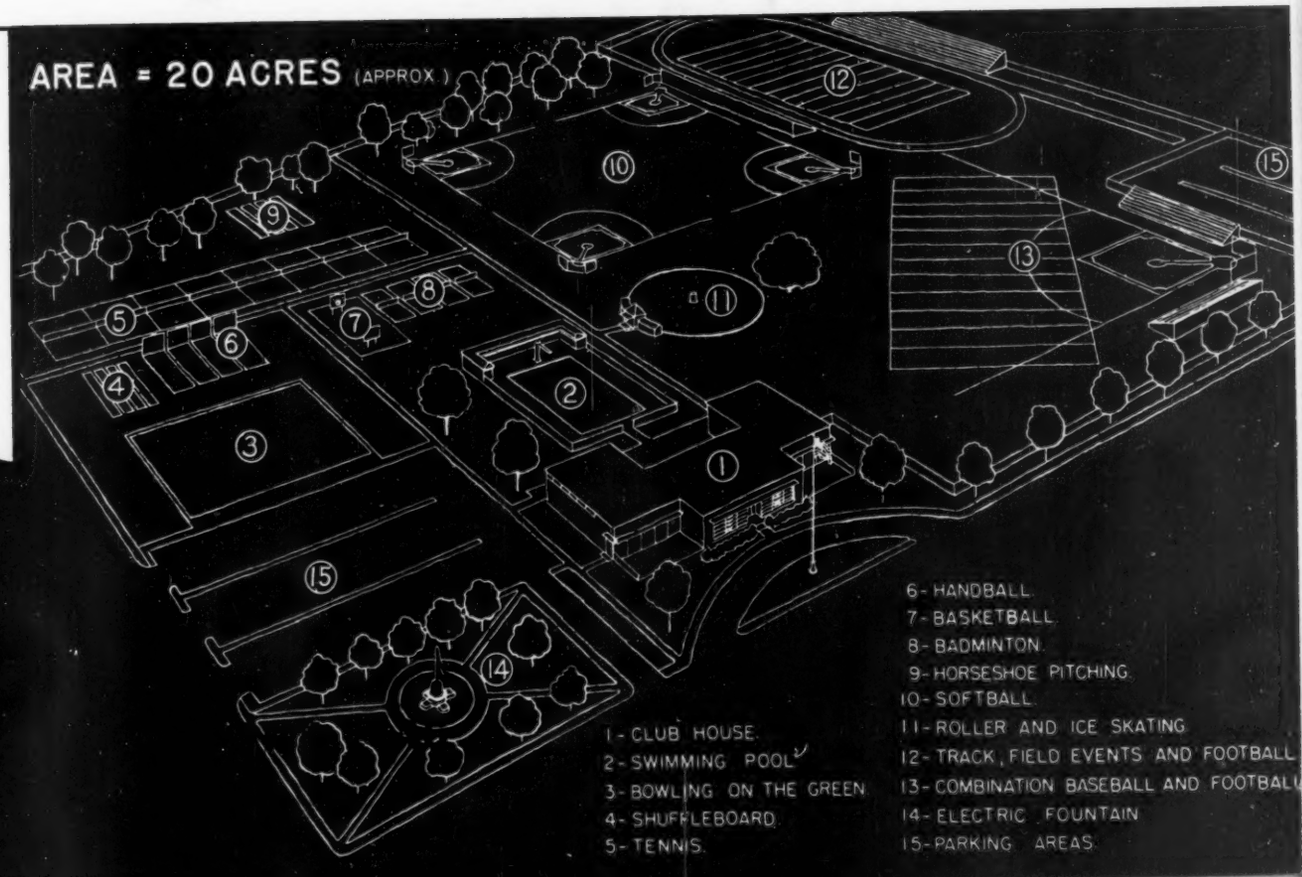
Building & Equipment Issue



A FRANK STATEMENT

regarding

the delivery of new

Sports Nets

WITHIN 24 hours after receiving the "go" signal, Gold Medal Tournament, Champion and Dreadnought sports nets were being made. Production, however, has been below normal because of reconversion difficulties. On top of this we have been swamped with orders.

The manufacture of these 3 sports nets will shortly be stepped up to the point where our back log of orders will be filled, and we will be able to take care of everyone. Meanwhile, net production is being concentrated on the types you need most urgently, and shipments are being made in proportion to previous sales.

All Gold Medal Tournament, Champion and Dreadnought nets continue to be made with the same care and attention to details that has made them famous for quality. Have you received a copy of our new sports catalog?

Gold Medal Champion
Gold Medal Dreadnought
Gold Medal Tournament
SPORTS NETS

Gold Medal Nets

THE AMERICAN NET & TWINE DIVISION
OF THE LINEN THREAD CO., Inc. • 60 E. 42 ST., N. Y. 17, N. Y.
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SCHOLASTIC COACH

Reg. U. S. Pat. Off.

IN THIS ISSUE VOL. 15, NO. 5

HERE BELOW (Around-the-Clock Play)..... 1

. . . AND THERE WAS LIGHT..... 7
By R. J. Swackhamer

FOOTBALL'S LITTLE-MISS MARKER..... 11
By M. B. "Bo" Lamar

REC CENTER MEMORIAL..... 12
By Howard Dwight Smith

BE SEATED! (Problem and Solution)..... 14
By F. E. Allen and H. R. Sleeper

MODERN DESIGN IN OUTDOOR SEATING..... 28

CINDER RUNNING TRACKS..... 30

TOUCHDOWN TURF 32
By Dr. John Monteith, Jr.

CARE OF EQUIPMENT THE YEAR 'ROUND.... 34
By John Strell, Jr.

GOOD DRAINAGE PAYS..... 38
By A. Carl Stelling

CHEERFUL LIGHT 40
By G. W. Frederick

STANDARDS FOR HEALTH FACILITIES..... 44
By Dr. Karl W. Bookwalter

COACHES' CORNER 52

NEW BOOKS 60

FOOTBALL RECORDER 63

Editor: OWEN REED
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Here Below

Around-the-clock play

This pithy analysis of the place of recreation in the educational scheme is excerpted from G. Ott Romney's fine new book, Off the Job Living *(A. S. Barnes & Co.), a review of which appears on page 60.*

THE public school systems control an almost interminable chain of facilities which must some day soon, in the name of common-sense, be put to general community use on an around-the-clock, around-the-year basis.

Our schools should do more than merely fill their traditional functions. They should be planned to meet community recreation and adult education needs, as well.

The school systems have grown accustomed to serving in terms of school-age groups. They are generally addicted to regimentation, and have a strong tendency toward confining recreation to the physical activity area.

They are also apt to wish additional responsibility on the already over-burdened teachers (frequently not qualified to assume leadership in recreation) and are so habituated to the spending of school funds for school-age youth in classroom routine, that they disqualify themselves for the assumption of the major responsibility for community recreation. They cannot logically provide the nuclear service.

PUBLIC schools should serve three fields of responsibility in recreation. Their first job is to provide the pupils with recreational attitudes and skills. Their second concern should be with the provision of after-school and recess recreational opportunities for those of school age. Their third responsibility should be to serve the community through facilities and leadership.

The first responsibility is being more nearly fulfilled by the school systems in general, although only a start has been made in this direction. The second is receiving increasing although, generally speaking, inadequate attention. The third, with a few notable exceptions, is just beginning to be acknowledged.

It is true that during the last decade adult education has received a tremendous upswing. Most of what is called "adult education" is pursued for the satisfaction in the doing rather than for credits or vocational preparation.

Adult education, then, and nursery school play constitute the chief contributions to community recreation reaching beyond school-age. Since it is impossible to separate the play life from the work life of the school child, more is being done in education for recreation than might be guessed.

IT should not be assumed that no strides have been made toward the utilization of school facilities for after-school and evening community recreation purposes. The functional planning of school buildings for general community use has evidenced great progress in the last decade.

Some highly successful coalitions have also been effected between school systems and municipal recreation systems. With varying degrees of authority municipal parks, playgrounds and schools have merged on occasion to provide outstanding examples in the field of public recreation service.

Speaking broadly, the schools must be looked upon as allies in any smoothly and effectively operated municipal recreation system —as integral members of the family.

Tomorrow it must be the rule rather than the exception to see school grounds of all kinds teeming with youngsters who have returned after school hours for participation in the things they choose to do in their own time for the gratification of the doing.

Adults should mingle with them or find their own groups. Light should flow from school windows each night, and other lights should drench outdoor areas, indicating general participation in music and fencing, softball and swimming, forums and wrestling, cooking and photography — and whatever else may find demand strong enough and facilities available.

A great many *church* buildings will lend themselves to similar service, instead of keeping their doors closed a great deal of the time and lifting a warning hand against laughter and noise, action and self-expression, which may also be a part of religion.

Just as I have seen happily conceived school plants alive with community recreation services, so have I seen churches render extensive favor to communities in terms of recreation, reaching far beyond their conventional functions.

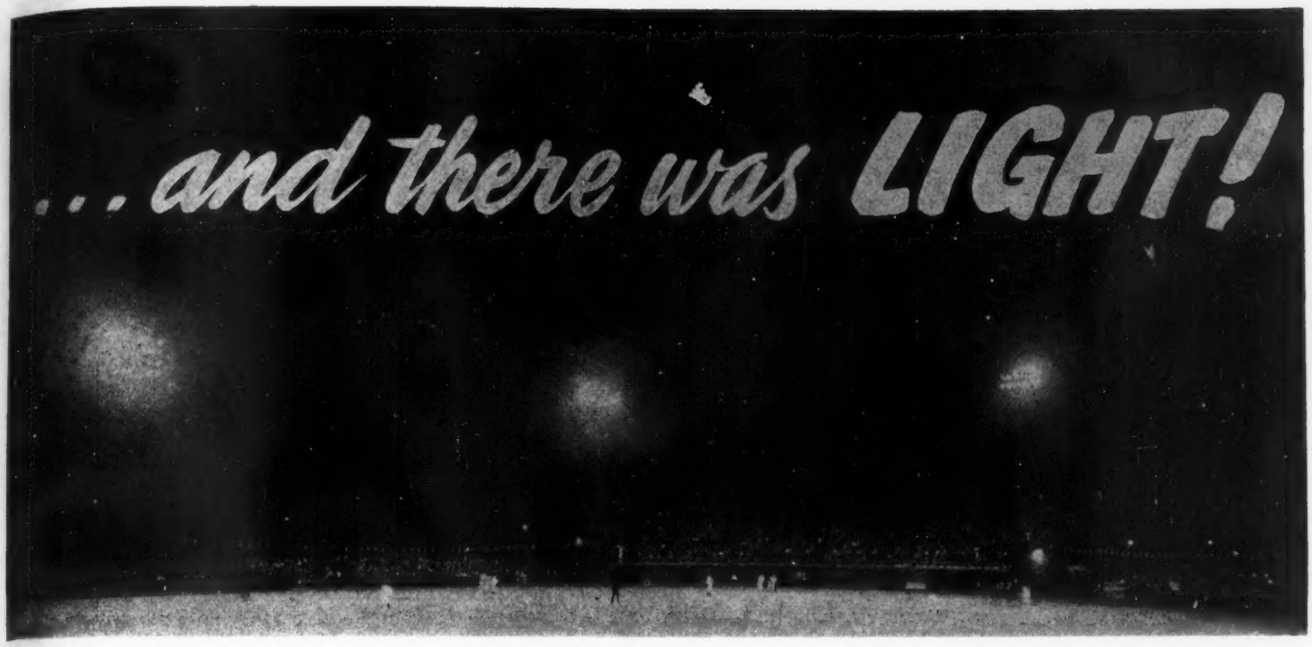
BUT the churches have never laid claim to assuming over-all sponsorship of recreation services. Our concern at the moment is with the public tax-supported agencies and units of government to which communities may look for at least the nucleus of receation service, guidance and support. The public schools, it would seem, eliminate themselves although not always by confession.

What then about the old-fashioned *park departments?* Parks bespeak play. But park superintendents of the old school have not always been happy about replacing "Keep off the grass" signs with open areas; and transferring the emphasis from manicuring lawns to operating swimming pools and cabins.

Too often they look down their noses at what they call the recreation program—revealing an ignorance of the commodity they are offering as well as a lack of sympathy for the service. They do not seem to sense that through their facilities they have acquired responsibility as recreationists, but because of lack of leadership services, their programs are inadequate.

It may be said, with only slight reservation, that in case of the coalition, the park director should be first a recreationist in a broad sense and then a parks man (as

(Concluded on page 49)



THE world of recreation is seeing the lights. More and more communities are incorporating lights into their recreational building plans.

The typical community development of the future will provide a well-balanced day and night athletic menu for both young and old.

This trend toward the illumination of fields and playgrounds has provoked a number of interesting questions concerning costs, installations, operation, etc. The more common posers, together with the answers, follow.

1. *What are the advantages of night play over day play?*

Answer: Night games allow more people to play and attend games. In some climates, heat conditions make evening games more comfortable.

2. *How much does it cost to install a sports lighting system?*

Answer: The cost of any job depends on the type of installation and the quality of equipment. Local practices and local contractor estimates should be sought. The accompanying combination field lighting plan should cost between $12,000 and $14,000. (See page 50.)

An eight-pole, 80-floodlight football lighting job with underground wiring and steel poles should cost between $6,000 and $7,000. Playground tennis courts can usually be lighted for between $500 and $700 a court.

3. *What factors determine the amount of light required for adequate seeing?*

Answer: Spectator visibility is usually the criterion by which an installation's success is judged. In few sports does the lighting level

by R. J. Swackhamer

As sports lighting expert for General Electric, R. J. Swackhamer is now designing the gigantic new Yankee Stadium floodlighting plant.

required for the players exceed that of the spectators.

4. *How high should the lighting level be?*

Answer: Lighting levels vary from five or ten foot-candles on a horseshoe or bowling green to 200 on a major league baseball field.

5. *How does this compare with daylight?*

Answer: On a dull overcast day, except at dusk, natural illumination is seldom less than 300 to 500 foot-candles. Bright sunlight reaches a high of 10,000 foot-candles.

6. *What is a foot-candle and how is it measured?*

Answer: A foot-candle is a unit of illumination equivalent to one lumen per square foot. A lumen is the amount of light that will fall on a surface one foot square and one foot away from a point light source of one international candle.

Foot-candles are measured directly by several methods. The best known method is the light meter. The light meter is not advocated for measuring foot-candles on sports and recreational fields because of the angles at which light is projected on these areas. The MacBeth illuminometer is recommended.

7. *How many floodlights does adequate illumination involve?*

Answer: See Table on page 10.

8. *How can we check our present lighting system for needed improvement?*

Answer: First of all, see how it compares with recommended practice. If the number of floodlights, mounting height, and locations are satisfactory, check the lamps and type of floodlight.

9. *How can a system be kept at top efficiency?*

Answer: The following periodic maintenance schedule, if followed carefully, should keep equipment at top efficiency. At the beginning of each season:

(A) Clean all floodlights thoroughly with soap and water; follow with Alzak cleaner if the floodlight is of modern design.

(B) Replace all badly blackened lamps with lamps of the same voltage.

(C) Replace all lamps if 75 percent of expected life has been reached.

(D) Check floodlight mounting bolts for looseness.

(E) Check all wiring connections.

(F) Check poles, cross arms, and distribution panels and boxes for corrosion. Paint where needed.

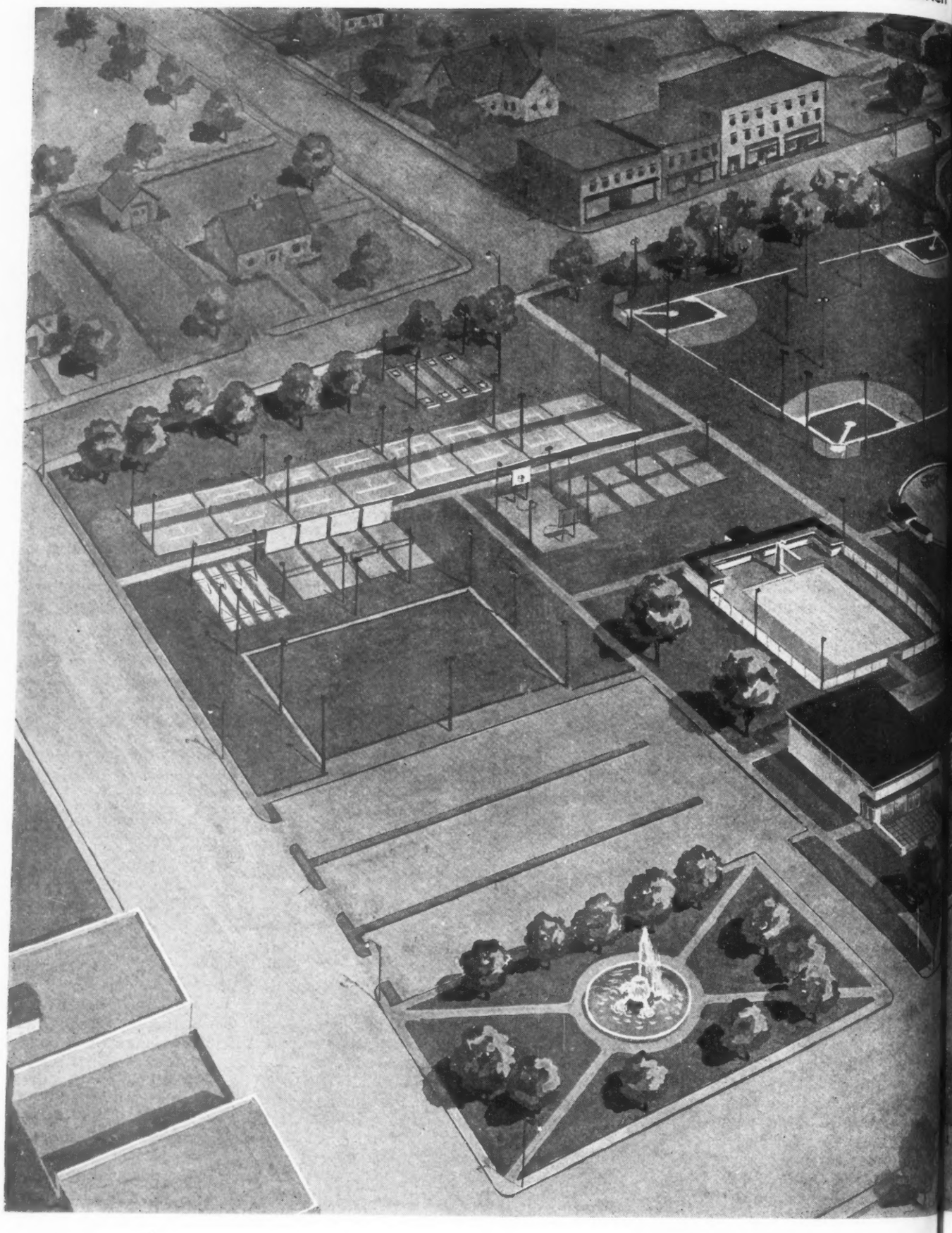
(G) Check all safety features such as pole steps and safety platforms.

10. *What is meant by Classes A, B and C referred to in the Table?*

Answer: These designations have been assigned by the Technical Committee of the National Electrical Manufacturers Association to classify football and softball in respect to the type or class of play.

Obviously, in top-notch high school football played to large audiences, both the skill of the players and the visibility of distant specta-

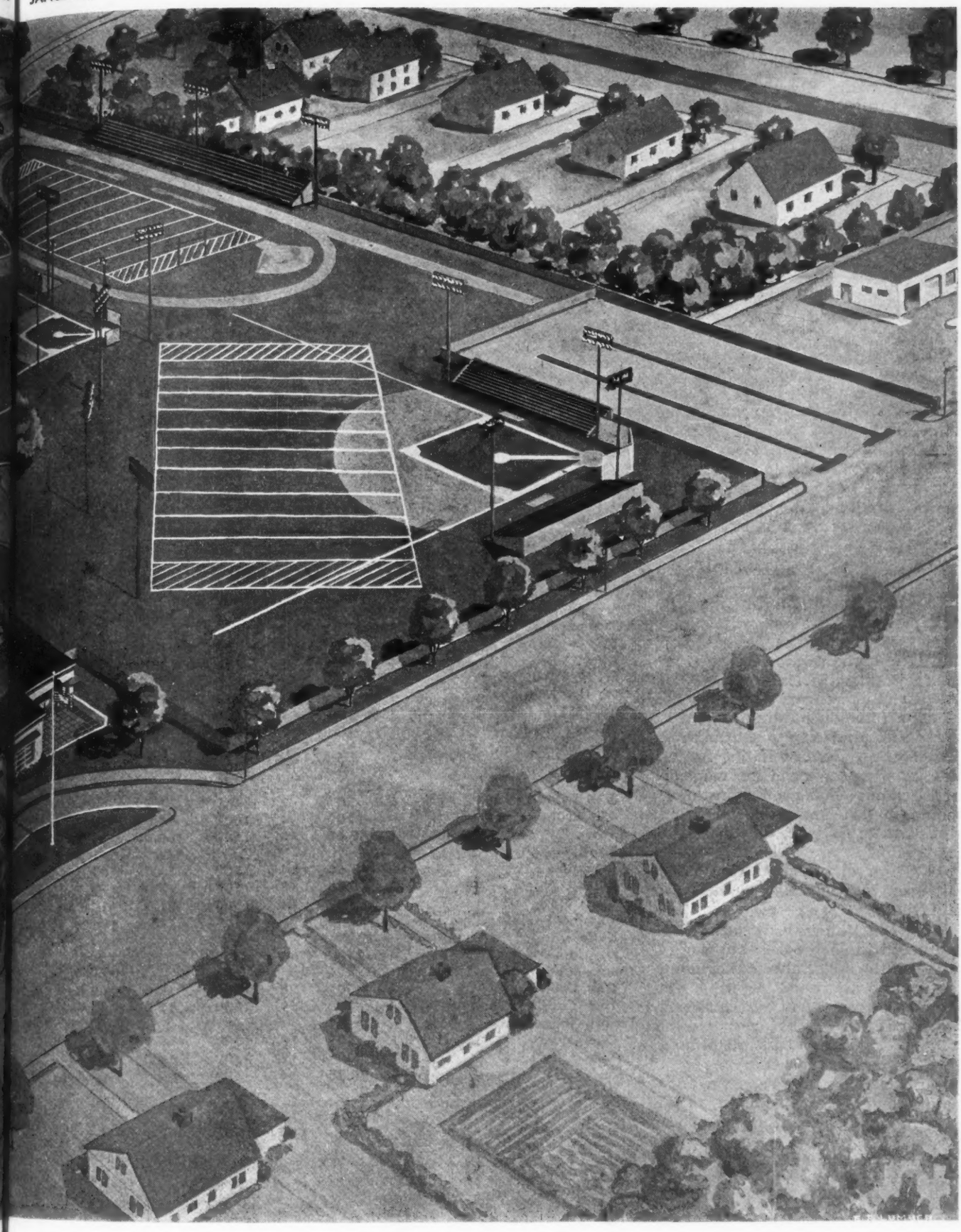
(Continued on page 10)



MODEL COMMUNITY LAYOUT FOR AROUND-THE-CLOCK PLAY

TO lengthen the hours of outdoor recreational enjoyment, more and more communities are incorporating lights into their athletic plants.

The accompanying plan blueprints the typical community development of the future — which



will provide a well-balanced day and night athletic program for both young and old.

A detailed list of the facilities is shown on the front cover. Note the excellent orientation of the fields, the fine economy of space and the easy accessibility afforded the community.

The area covers about 20 acres. In it are concentrated facilities for: swimming, bowling (on the green), shuffleboard, tennis, handball, basketball, badminton, horseshoe pitching, softball, roller and ice skating, track, football and baseball.

The layout also includes a clubhouse, an electric fountain and parking areas.

All in all, it takes care of every normal community need.

(Continued from page 7)

tors require higher levels of lighting.

Tournament softball should be provided with Class A lighting, whereas the play-ground game might be quite satisfactory under Classes B and C.

11. *Can the installation be made by an electrician, or must a sports lighting expert be called in?*

Answer: Practical sports lighting experience has resulted in standardized layouts. These are available from all recognized manufacturers of sports lighting equipment. They may be readily followed by your contractor.

12. *What are the most important considerations in sports lighting?*

Answer: Visibility is the primary factor. This in turn depends upon (1) an adequate level of lighting, (2) proper choice of floodlighting equipment, (3) adequate mounting height, and (4) proper location of the poles and floodlights.

13. *Can play areas be laid out in ways most economical for lighting?*

Answer: All of today's fields should be planned with the idea of future lighting. This means that the designer should know where the lights will eventually go, so there will be minimum interference from the seating facilities.

The combination of several sports under a common lighting system is the most logical way to get the most out of one system of lights. Activities can be changed to coincide with seasonal changes. For instance, tennis courts and roller skating rinks are often used in winter for ice skating.

14. *What about areas that have not been laid out with lighting in mind?*

Answer: Difficulty is often encountered in such cases, but workable solutions can always be found to incorporate good lighting. In these cases competent advice should be sought.

15. *What is the best all-around type of sports floodlight?*

Answer: An enclosed general-purpose ground area floodlight made of aluminum. Modern sports floodlights have offset reflectors and doorglass assemblies designed for convenient servicing.

16. *What size lamp bulb should be used for best and most economical results?*

Answer: By referring to the Table, you will note that lamp sizes vary from 250 to 1500 watts, depending on the application involved.

17. *What is the average size of the modern sports light?*

Answer: The size of a floodlight is governed by the radiation of heat. This is usually about 2½ to 3 square feet of projected area to windage—or 18 to 20 inches in diameter.

18. *Why are incandescent bulbs universally used for sports lighting?*

Answer: Because of their compactness, ruggedness and inherent characteristics: efficiency, unity power factor, and steady operation. Gaseous discharge lamps, such as fluorescent, mercury and sodium, have one or more of the following objectionable characteristics: stroboscopic (or flickering) effect; unfavorable quality or color of light; accessories needed; physical sizes of lamp and light source.

These are objections which, reflected in increased cost of installation and operation, cannot be justified in an installation that is operated relatively few hours a year.

19. *At what voltage should the system be operated?*

(Continued on page 50)

SPORTS AND RECREATIONAL LIGHTING RECOMMENDATIONS

Sport	FLOODLIGHTS: No. Poles	Mounting Ht. (Ft.)	Number	Lamp	Rated Voltage	KW LOAD AT 5% Over-voltage	KW LOAD AT 10% Over-voltage
Badminton	2	20	4	500	2.0	..	..
Baseball							
Municipal	8	80	120	1500	180.0	194.5	209.0
Minimum	8	60-80	100	1500	150.0	162.0	174.0
Basketball	4	30	8	1500	12.0	13.0	13.9
Boxing or Wrestling Ring	4	18	8	1000	8.0	8.6	9.2
Bowling Greens	8	30	12	1000	12.0	13.0	13.9
Croquet	4	20	4	300	1.2	..	..
Curling Rink	8	30	12	1000	8.0	8.6	9.2
Football							
Class A	8	60-80	128	1500	..	..	215.0
Class B	8	60-80	96	1500	..	..	167.0
Class C	8	60-80	72	1500	..	..	125.0
Six Man	6	40-60	36	1500	..	..	62.7
Golf Driving							
One 30 ft. pole for each 50 ft. of tee with the following per pole	..	..	3	1500	..	..	..
	..	..	3	1000	..	..	..
Handball—Playground							
1 pole for 2 courts with the following per pole	..	25	2	1500	..	..	..
Tournament Play							
1 pole per court with the following per pole	..	30	2	1500	..	..	..
Hockey Rink	8	35	16	1500	..	..	..
			4	1000	28.0	30.3	32.3
Horseshoes							
1 to 3 Courts	2	20	2	750	1.5	..	..
4 to 8 Courts	4	20	4	750	3.0	..	..
Shooting—Archery							
30 ft. Range	1	10	1	250	0.25	..	..
50 ft. Range	1	10	1	500	0.50	..	..
75-100 ft. Range	1	10	1	1000	1.00	..	..
Trap	2	20	8	1000	8.0	8.6	9.2
Skeet	2	25	10	1000	10.0	10.8	11.6
Shuffleboard							
1 to 3 Courts	2	20	2	750	1.5	..	..
4 to 8 Courts	4	20	4	1000	4.0	..	..
Soccer	8	40-60	40	1500	60.0	65.0	69.5
Softball							
Class A	8	40-60	24	1500	36.0	39.0	42.0
Class B	8	40-60	18	1500	27.0	29.2	31.3
Class C	6	40	14	1500	21.0	22.7	24.4
Swimming Pools							
Underwater	..	..	..	..	..	..	..
Overhead	4-6	25-30	6-8	1500	..	..	..
Tennis—Playground							
One Court	4	30	8	1000	8.0	8.6	9.2
Two Courts	4	30	8	1500	12.0	13.0	13.9
Tennis—Tournament							
One Court	8	30	12	1000	12.0	13.0	13.9
Two Courts	8	30	12	1500	18.0	19.5	20.9
Volley Ball	2	20-25	4	500	2.0	2.2	2.3

FOOTBALL'S LITTLE-MISS MARKER!

By M. B. "Bo" Lamar

A pistol-type all-seeing eye that measures distance with amazing speed and precision.

SENSATIONAL is the word for the fastest precisest football measuring device ever invented—"The Grid Eye." On any field, under any conditions, on every conceivable play, it credits both teams with every inch of yardage gained or defended. All with instant speed and hair-line accuracy.

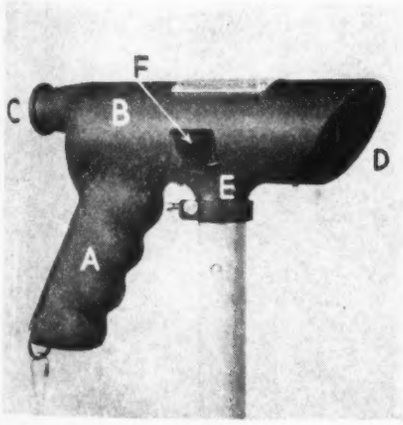
Although used by the U.S. Naval Academy the past four seasons, this efficient little instrument really won its spurs in the Cleveland-Washington pro titular play-off on December 16. Despite abominable playing conditions, the Eye gauged the ball's progress with a rapidity and accuracy that amazed.

The linesman's chain was set swiftly and precisely on the nose of the ball every time. On first-down determinations, with the lines under ice, the Eye was slipped on the fore rod of the linesman's chain, and the decision given in a flash, without run-out of the chain, without reference to any yard-line or delay in the game!

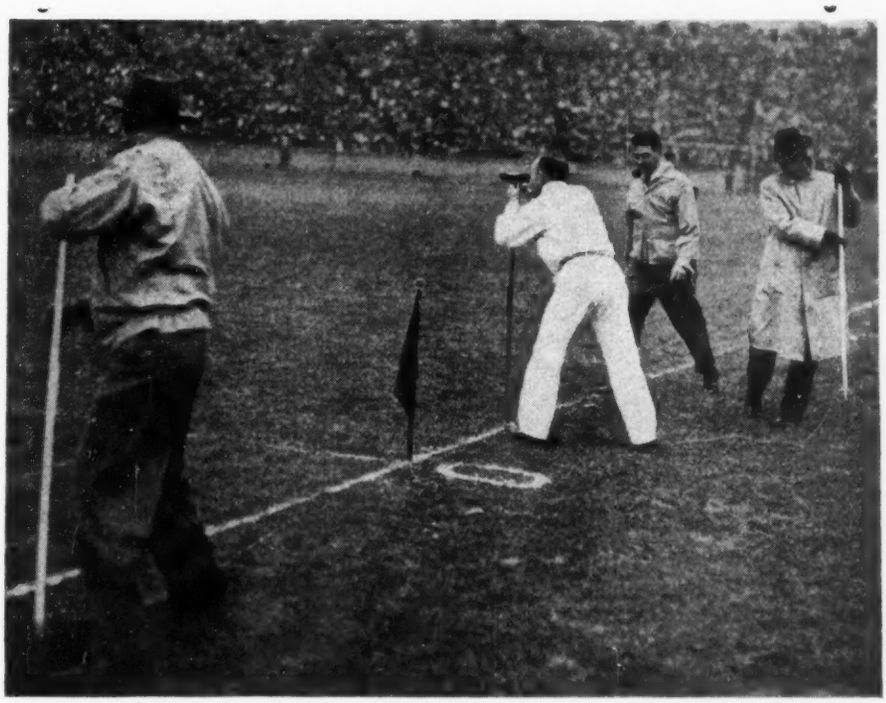
Despite the adverse conditions and the fact that three of the officials had never seen the instrument before, the game was run off in near record time!

In appearance, the Eye closely resembles an automatic pistol. It has a streamlined pistol grip (A) molded into a telescope-like barrel (B), through which the sighting is made.

The eyepiece (C) is molded into the rear end of the barrel. In the muzzle is a lens (D) carrying a hair-fine line. On the lower part of the barrel is a stubby appendage slightly less than an inch in diameter (E). This stub slips into the upper end of a strong tubular metal linesman's rod.



All ready to "shoot!"



The Grid-Eye in action on the goal line (Navy-Michigan).

Inside the barrel is a small precision mirror that pivots to present its reflecting surface to an opening on either side of the barrel (F). The field of view is seen through the eyepiece.

In game operation, the Eye is mounted on a tubular rod. The rod is held erect on the sideline at a point estimated to be opposite the ball. The sighting is then made.

A glance through the eyepiece with the muzzle pointed cross-field reveals in the precision mirror an image of the sideline stripe. The stripe appears as an extra yard-line extending out on the field from the point occupied by the rod. Above this image the ball is seen directly.

By simply pivoting the instrument on the rod, the imaged sideline is brought into vertical alignment with the hair-line on the forward lens.

When the imaged sideline is aligned with the vertical hairline, the latter defines a true vertical plane across the playing field perfectly parallel to the goal- and yard-lines, or at geometrically perfect right angles to the sidelines.

The position of the most forward point of the ball in relation to the hairline vertical plane, governs!

It is like having a perfect yard-line of hair-breadth thickness to sight along from any point selected on a sideline. You can't miss. The Eye and its rod move along the sideline to a point opposite the ball on every play.

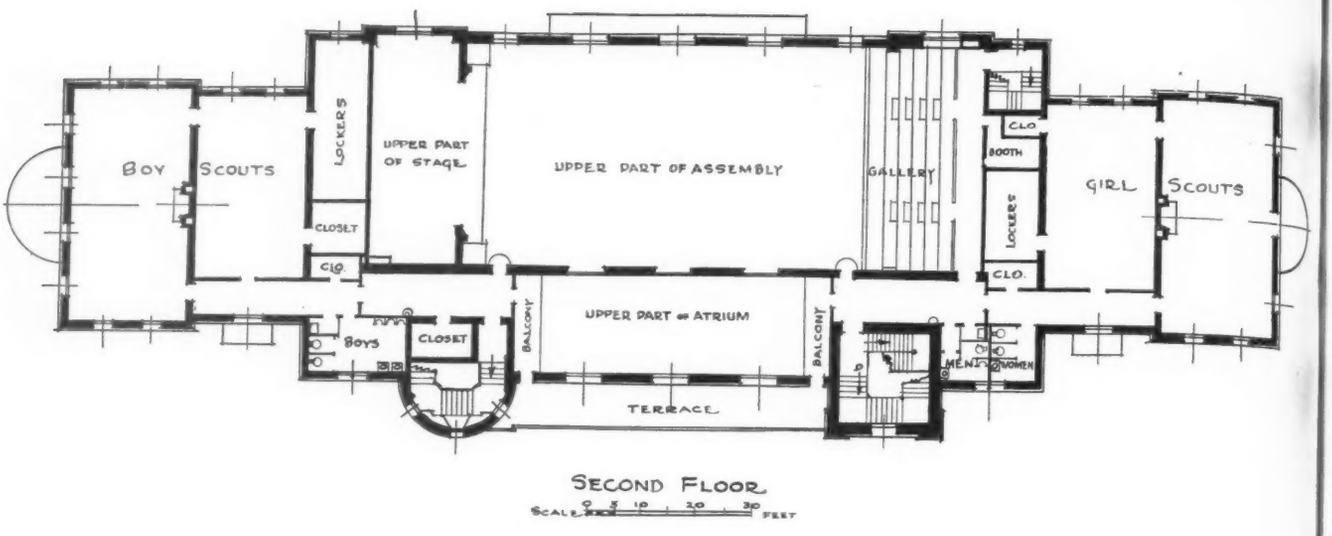
On first-down determinations, the instrument is slipped off the box-stick and onto the fore rod on the chain. In snow or heavy mud, small markers in the form of tiny pennants are placed at 10-yard intervals to define the sideline.

The Eye can thus determine immediately and precisely whether the most forward point of the ball is short, opposite or beyond the point occupied by the rod. That's all you need to know.

A small bubble seen in the barrel during the sighting tells when the instrument and the rod are in plumb position. There is nothing to screw or focus. You just look through the eyepiece!

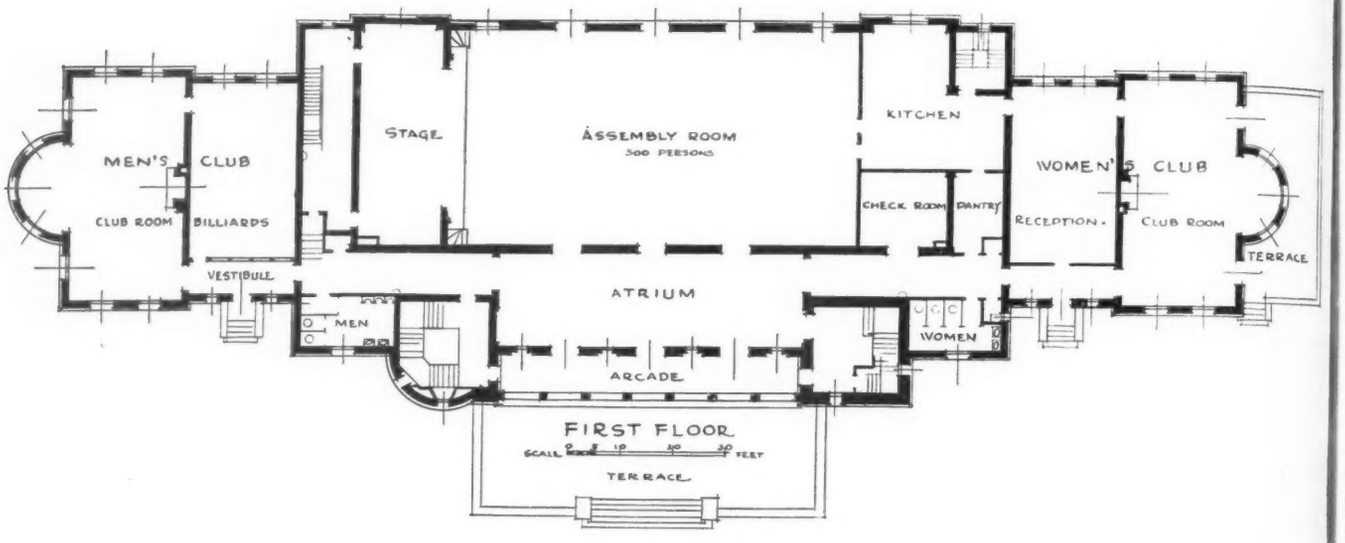
The rods are of light, strong metal tubing attractively finished in bright colors selected for high visibility. The top of each rod fits the Eye.

The rods attached to the chain are painted differently from the "free" rod carrying the down-indicator box, to avoid confusion. The chain snaps on and off by swivel-snaps, preventing twisting, kinking and foreshortening, and making for easy portage.



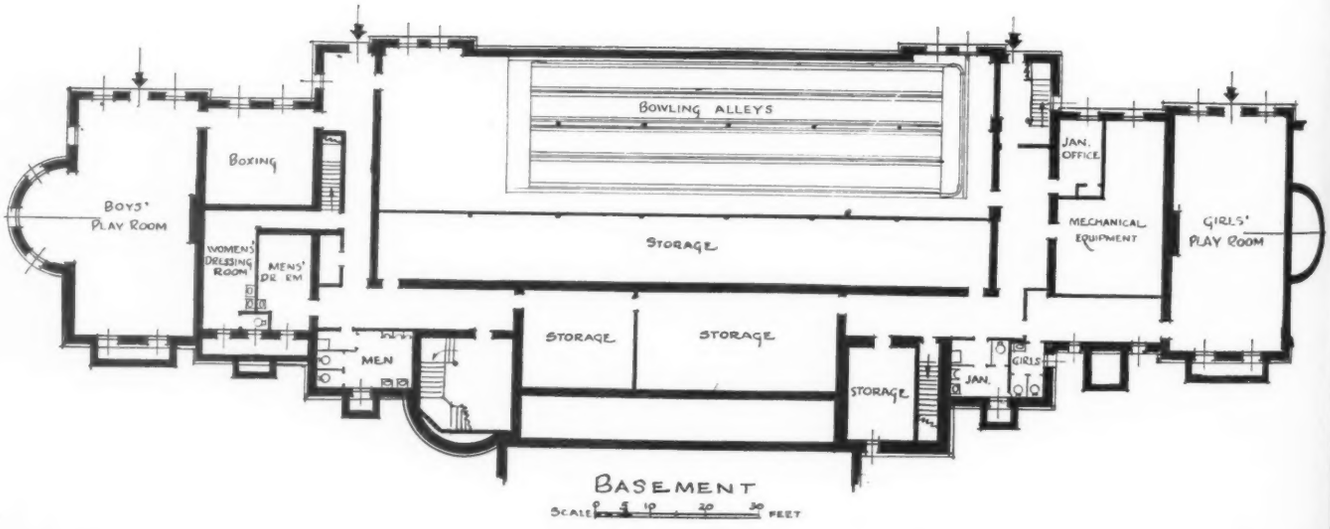
SECOND FLOOR

SCALE 0 5 10 20 30 FEET



FIRST FLOOR

SCALE 0 5 10 20 30 FEET



BASEMENT

SCALE 0 5 10 20 30 FEET

RECREATION BUILDING BLUEPRINTS

Mariemont's rec center features four bowling alleys in the basement, an assembly hall on the first floor and two scout rooms on the second

Rec Center Memorial

by HOWARD DWIGHT SMITH

Howard Dwight Smith is architectural advisor of the American Commission for Living War Memorials.

WITH thousands of communities definitely war-memorial conscious, the story of the Mariemont, Ohio, recreation program is particularly timely.

The Mariemont story emphasizes the beneficent and lasting effect of well-planned municipal facilities as living memorials. But perhaps even more than this, it provides a significant lesson in community cooperation for recreation programming.

Mariemont is situated at the junction of the Little Miami and the Ohio Rivers, ten miles from the center of Cincinnati. The town provides for 50 acres of parks, playgrounds and village greens. The principal park and recreation areas include:

1. Dogwood Park, a 25-acre area with a small shallow lake at the head of a ravine for boating, and a large upper level for baseball and other sports.

2. Dale Park, an area of about eight acres, boasting a number of formal gardens and a generous open play area adjoining the elementary school and the community (undenominational) church.

3. Miami Bluff Drive, a two-mile concourse along the river front.

4. The recreation field which adjoins the high school and the Thomas J. Emery Memorial Recreation Building. (See facing page.)

Of first importance in the recreation program is the Recreation Building. This structure was built by Mrs. Mary J. Emery as a gift to her fellow citizens.

Organizations within the village have the run of the building at no expense. The community church, for example, uses a number of rooms for a Sunday school program, while the mayor occupies office space. During the war, the building quartered such community war agencies as the Red Cross and Civilian Defense.

The assembly room of the rec building seats 500. It has an ample theatre stage, a motion picture and television projection booth and radio outlets. The facilities include boy scout and girl scout rooms, club rooms for men and women, four bowling alleys, and a rifle range.

The adjoining tennis courts are maintained and operated by a community tennis club, which all residents are eligible to join upon payment of a nominal membership fee. The football field in the natural stadium is leased to the board of education for use by the high school.

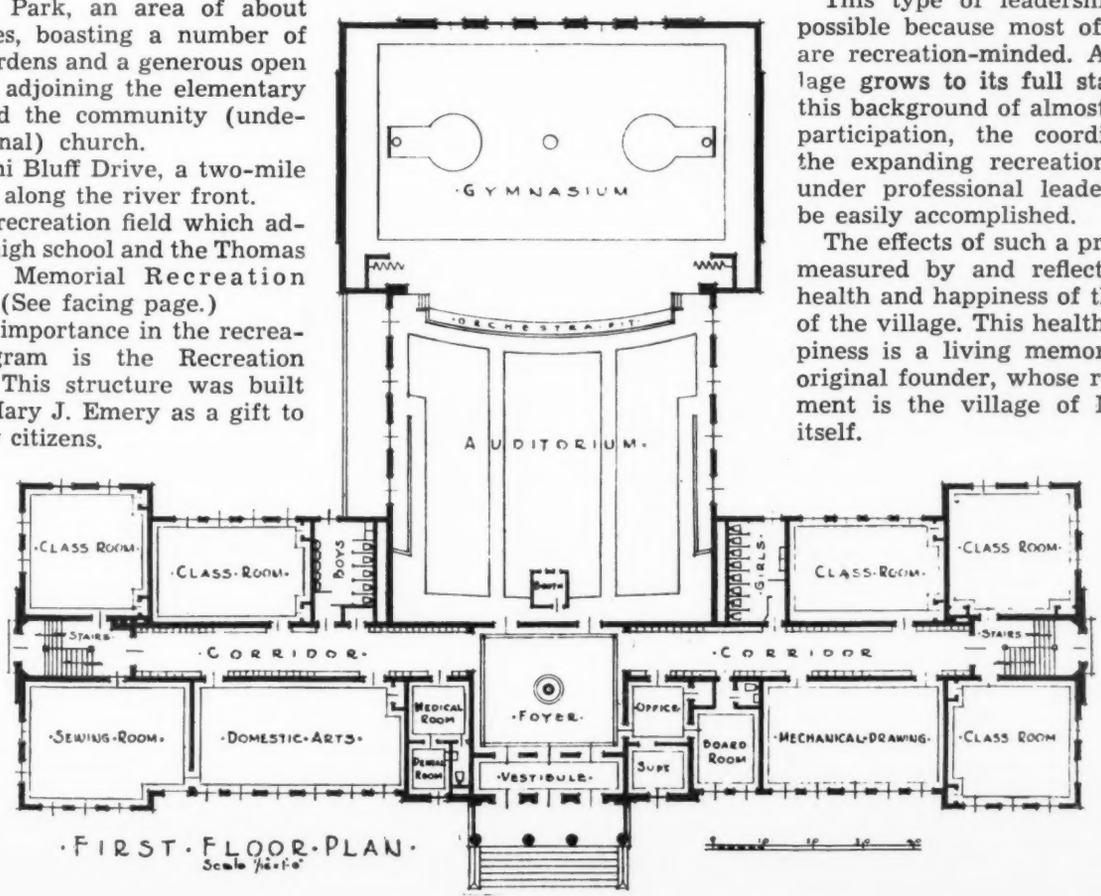
The first floor plan of the school building (below) shows the economical provision for recreation in a stage-gymnasium. This arrangement provides spectator space for contests without adding cubage to the building for bleachers seating around the playing floor.

For small schools with modest programs, this arrangement is generally satisfactory. For larger programs, however, it has certain recognized disadvantages. Among these are the difficulty of fitting boys' and girls' physical education classes and basketball practice into a normal day's schedule, and the impracticability of using the gym and auditorium simultaneously.

The regular high school physical education and interscholastic sports program is handled by the high school staff. The broad program of community activities, scouting, "knot-hole" baseball, special holiday events, and the like are led by interested adults.

This type of leadership is only possible because most of the folks are recreation-minded. As the village grows to its full stature with this background of almost universal participation, the coordination of the expanding recreation program under professional leadership will be easily accomplished.

The effects of such a program are measured by and reflected in the health and happiness of the citizens of the village. This health and happiness is a living memorial to the original founder, whose real monument is the village of Mariemont itself.



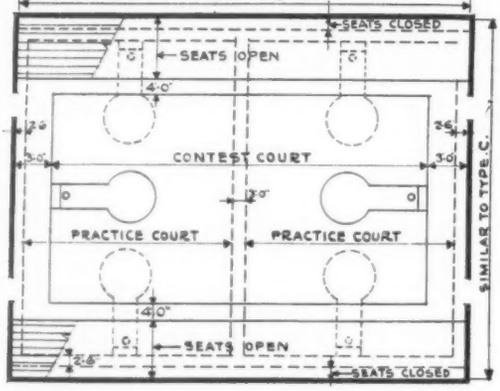
FIRST FLOOR PLAN
Scale 1/16"=1'-0"

GYMNASIUM PLAN TYPES

TYPE A. 1-UNDIVIDED SPACE

APPROX. MIN. FOR FULL WIDTH PRACTICE COURT — COLLEGE AND H.S 105' / JUNIOR H.S. 92'

APPROX. MIN. FOR FULL LENGTH CONTEST COURT (PRACTICE COURT NOT FULL WIDTH) — COLLEGE 100' / HIGH SCHOOL 90' / JUNIOR H.S 80'

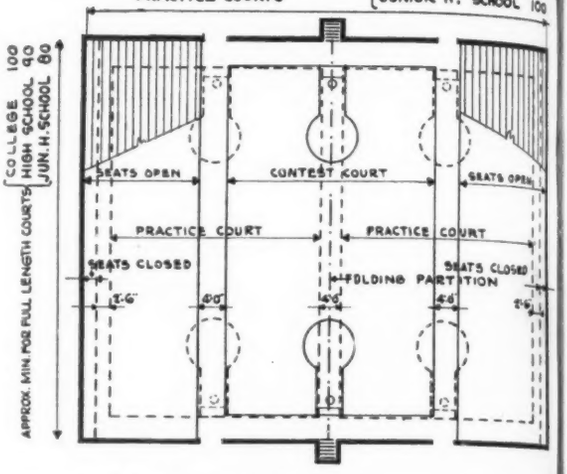


NOTES

ALL DIMENSIONS SHOWN ARE MINIMUM.
CONTEST COURTS WITH SEATS OPEN FULL LINE
PRACTICE COURTS WITH SEATS CLOSED BROKEN LINE
FOLDING PARTITION LINE

TYPE D 1-SPACE CONVERTABLE TO-2 SEATS PARALLEL TO COURTS

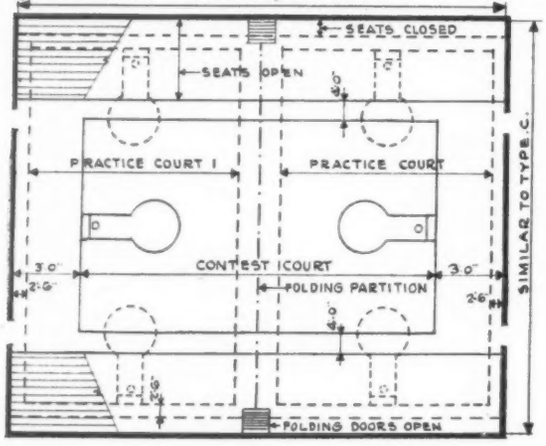
APPROX. MIN. FOR FULL WIDTH PRACTICE COURTS — COLLEGE AND H.S. 116 / JUNIOR H. SCHOOL 100



TYPE B. 1-SPACE CONVERTIBLE TO-2.

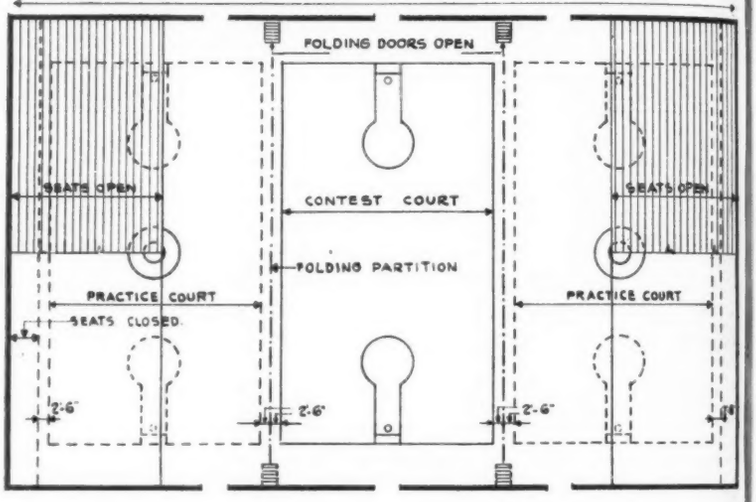
APPROX. MIN. FOR FULL WIDTH PRACTICE COURT — COLLEGE AND H.S. 110 / JUNIOR H.S 94

APPROX. MIN. FOR FULL LENGTH CONTEST COURT (PRACTICE COURTS NOT FULL WIDTH) — COLLEGE 100 / HIGH SCHOOL 90 / JUNIOR H.S 80



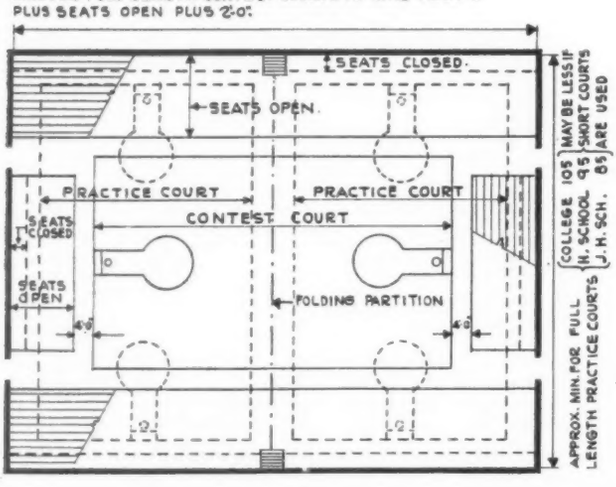
TYPE E 1-SPACE CONVERTIBLE TO-3

MIN. FOR COLLEGE FULL WIDTH COURTS 165' + DEPTH OF SEATS CLOSED

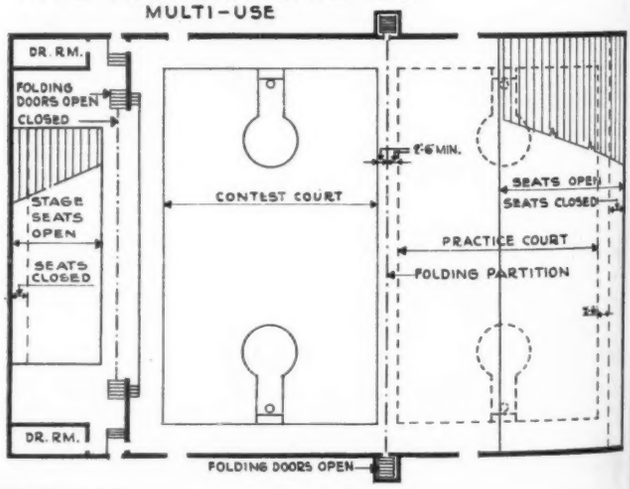


TYPE C. 1-SPACE CONVERTIBLE TO-2

MIN. FOR FULL WIDTH PRACTICE COURTS IS LIKE PLAN B PLUS WIDTH OF SEATS CLOSED.
MIN. FOR FULL LENGTH CONTEST COURTS IS LIKE PLAN B PLUS SEATS OPEN PLUS 2'-0".



TYPE F. 1-SPACE CONVERTIBLE TO-3. MULTI-USE



HAROLD R. SLEEPER, A.I.A.

MODEL GYM SEATING PLANS: Prepared for the Gymnasium Seating Council by Harold R. Sleeper, A.I.A., these excellent plans will help interpret the use of folding gym seats and folding partitions for the program requirements of your school gym, at a minimum of cost. The term "folding gym seats" as used herein, includes seats or bleachers designated by manufacturers as rolling, telescopic, movable and folding. Program functions other than athletic have been omitted except in Plan D. It is obvious, however, that the floor areas may serve many functions other than athletic.

Be Seated!

THE PROBLEM

by F. Ellwood Allen

F. Ellwood Allen, recreation-building planner extraordinary, is now serving as a consultant to many city and community recreational projects.

ANYONE who has ever planned the seating of an indoor or outdoor sports plant is still probably suffering from migraine headaches.

Many factors contribute to the difficulty of the job. For one thing, it is extremely difficult to remedy an existing physical condition. Take the overly small gym, for example. How can you provide adequate seating when you have no room to work with?

The solution to such problems lies in *intelligent* planning.

A mid-west city recently decided to erect a civic auditorium and sports arena. To determine the size and capacity of the building, the city conducted a survey. Two factors were apparent. First, the population—about 128,000, with an additional 11,000 in the armed forces. Second was the fact that, while the available high school gym accommodated 3,800, hundreds were turned away at basketball games.

The survey uncovered a considerable difference of opinion. There were many who thought the arena should seat at least 20,000. On the surface, this didn't appear unreasonable. In reality, it was fantastic.

The initial cost and subsequent operational-maintenance costs of a building that size would be prohibitive. While certain games might attract 20,000, most others would do well to draw half that many.

In planning indoor seating facilities, it is essential to consider average rather than maximum attendance. So, in this particular instance, an arena with a 7,500-capacity was recommended. Even this size arena represents a great capital outlay and can only be justified by multiple use.

In the city in question, the building not only met the seating requirements of the popular scholastic basketball games, but served as a center for all types of sport and social events. With refrigeration equipment, it could be used for ice activities as well.

In all planning, thought and care must be given to maintenance. The modern facility should not be set aside and used only periodically. If it is to be a real asset to the community, it should be flexible in design and in constant use. One activity may require no seats. Another may demand the maximum capacity.

The seating units should be designed to assure a minimum of labor in placement. The introduction of folding or accordion bleachers has done much to reduce labor in such change-overs.

In the future, we must devise even greater labor saving devices.

Seating for outdoor events does not present as serious a problem. Yet we probably find more "white elephants" outdoors than indoors. This is particularly true in the case of the stadium.

Every community is proud of its football team and wants to show it off in a stadium. But in too many instances the community, with no sense of proportion, thinks in terms of a "Rose Bowl." It is ridiculous to spend a small fortune on a stadium for five football games a year.

Many communities who have failed miserably to provide even basic recreation facilities can still talk of constructing an elaborate stadium for high school games. The stadium has a definite place in the community, but it must be correlated with the whole recreation program.

THE SOLUTION

by Harold R. Sleeper*

IN general, seats for gymnasiums may be divided into the following types and sub-divisions:

(a) Folding gym seats—wall attached or movable.

(b) Fixed, permanent or built-in —chairs or bleachers.

(c) Removable or portable bleachers or folding portable chairs.

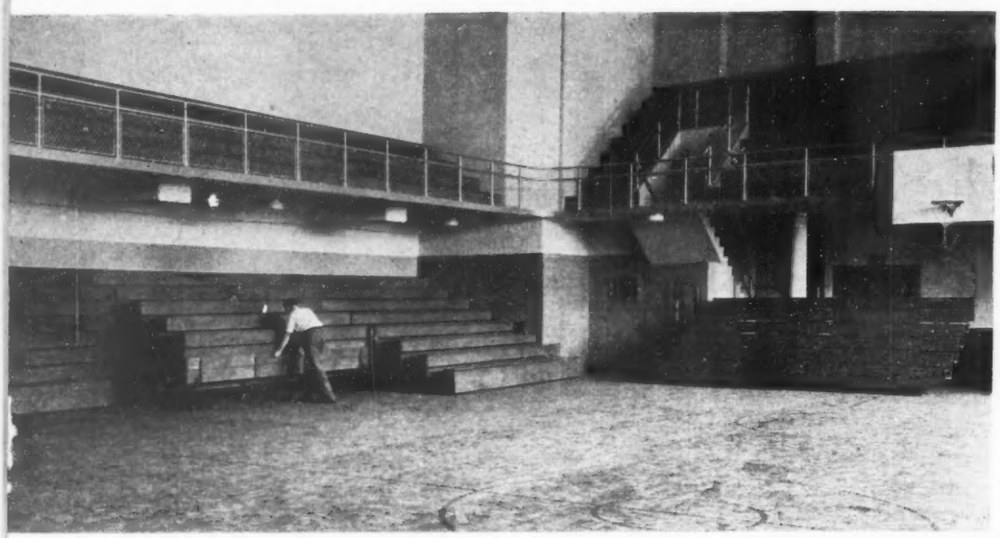
Fixed seats need not be explained to architects. They have been used since the time of the Greeks. However, modern planning demands the greatest possible economy of space, and where such space may serve a dual purpose, fixed seats are an unnecessary extravagance. Not only is their entire area devoted to one use but their initial cost is greater than that of other types of seats. Their only proper function is for use where the space they occupy may not serve any other purpose.

For instance, fixed balcony seats may provide sufficient head room for efficient use of space below, or they may be employed where they serve as the upper tiers with folding gym seats forming the lower sections of the spectator stands.

It has been customary to use fixed seats for swimming pools. However, space for exercise and life-saving instruction may be gained if the combination referred to is used. The folding gym seats for such purposes should be made with impregnated wood and with metal parts protected from corrosion.

Many existing installations of

*Condensed from the excellent 12-page bulletin, *Modern Gymnasium Seating*, prepared for the Gymnasium Seating Council by Harold R. Sleeper, A.I.A. For your free copy, write to the Gymnasium Seating Council, 737 Guardian Bldg., Cleveland 14, Ohio.



***Rolling-type seats,* fully closed, partly open and fully opened for use. At right is a fully opened movable section.**

fixed seats exhibit waste of area by too generous row spacing as well as by costly type of seats. The tendency to play safe in spacing costs the owner money.

There is no reason for bleacher row spacing 2′ 4″ to 2′ 8″ on center when experience with school and college seating proves that 1′ 10″ spacing is adequate. Nor is there need to provide chairs with widths 1′ 6″ to 1′ 10″ when folding gym seats prove suitable with space allowance of 1′ 4″ per person. Thousands of such minimum installations are successfully serving this purpose.

Portable bleachers have been perfected so that no great skill is required in their erection. They provide space saving comparable with folding seats. This storage space may be a closet or store room and not within the seating space. This same result may be secured with the movable type of folding gym seats.

The Plan on page 14 will help interpret the use of folding gym seats and folding partitions at minimum cost.

Program functions, other than athletic, have been omitted except in Plan D. However, it is obvious that spaces may serve many uses other than athletic, such as contest courts, with seats closed; as dance floors; or with seats open as auditoriums and assembly rooms.

For the latter, additional seating may be provided by the use of movable folding seats. Practice courts when enclosed by folding partitions may provide band practice rooms, small club or assembly rooms.

Plan type A. Requirements: One space only.

One full-size basketball court for contests, with seats. Two practice courts, to be used also as an exercise room. Whether or not the practice courts are full size depends on the seating requirements. With a small seating requirement the practice courts would be below standard size. Such courts are satisfactory for most practice uses.

Plan type B. Requirements: One space convertible to two spaces.

One full-size court for contests, with seating: or large gymnasium without seats. For simultaneous use —one boys gym, or full-size practice basketball court; and one girls gym, or full-size practice basketball court.

This scheme illustrates the use of a folding partition to divide the contest court into two separate gyms or practice courts.

Plan type C. Same as Plan B, with end seats added for greater seating capacity.

Plan type D. Requirements same as for "B", but with a larger seating capacity. Seats run parallel to the length of the court.

Plan type E. Requirements: One space convertible into three spaces.

One college basketball court—with large seating capacity and wide clearance between seats and court for cheer leaders, etc. Three practice courts full college size, all separate.

Plan type F. Requirements: Multi-use space. One space convertible into three spaces. Electric folding partitions are advisable for these uses.

(a) One full-size basketball court for contests, with seating.

(b) One stage with auditorium, large seating capacity.

(c) Two spaces which will provide the following functions as alternates: One full-size boys basketball court and one full size girls basketball court, or two gymnasiums, or two exercise rooms.

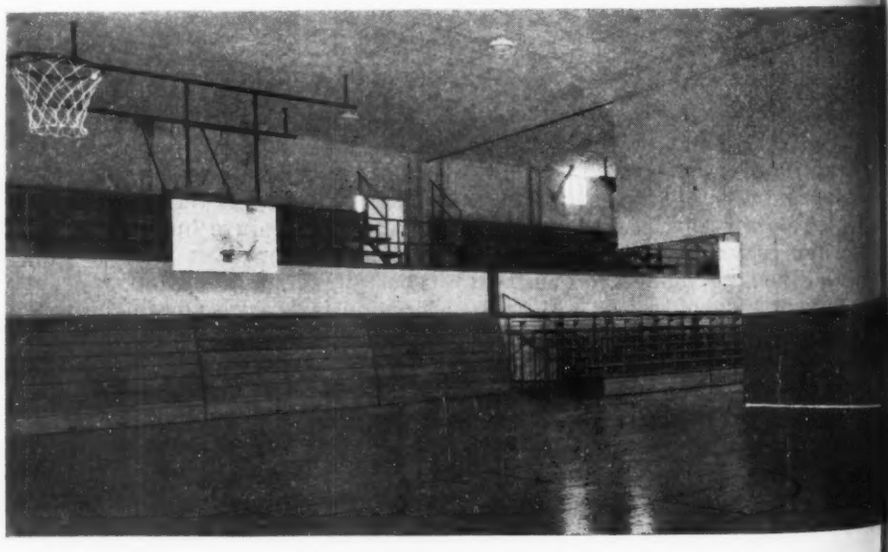
(d) Stage for use as exercise room or practice room. Stage may be raised as indicated, or on level with auditorium.

Plan type G. Not illustrated. Large space convertible into two spaces. Requirements: Gymnasium with seating, stage and standard fixed seat auditorium.

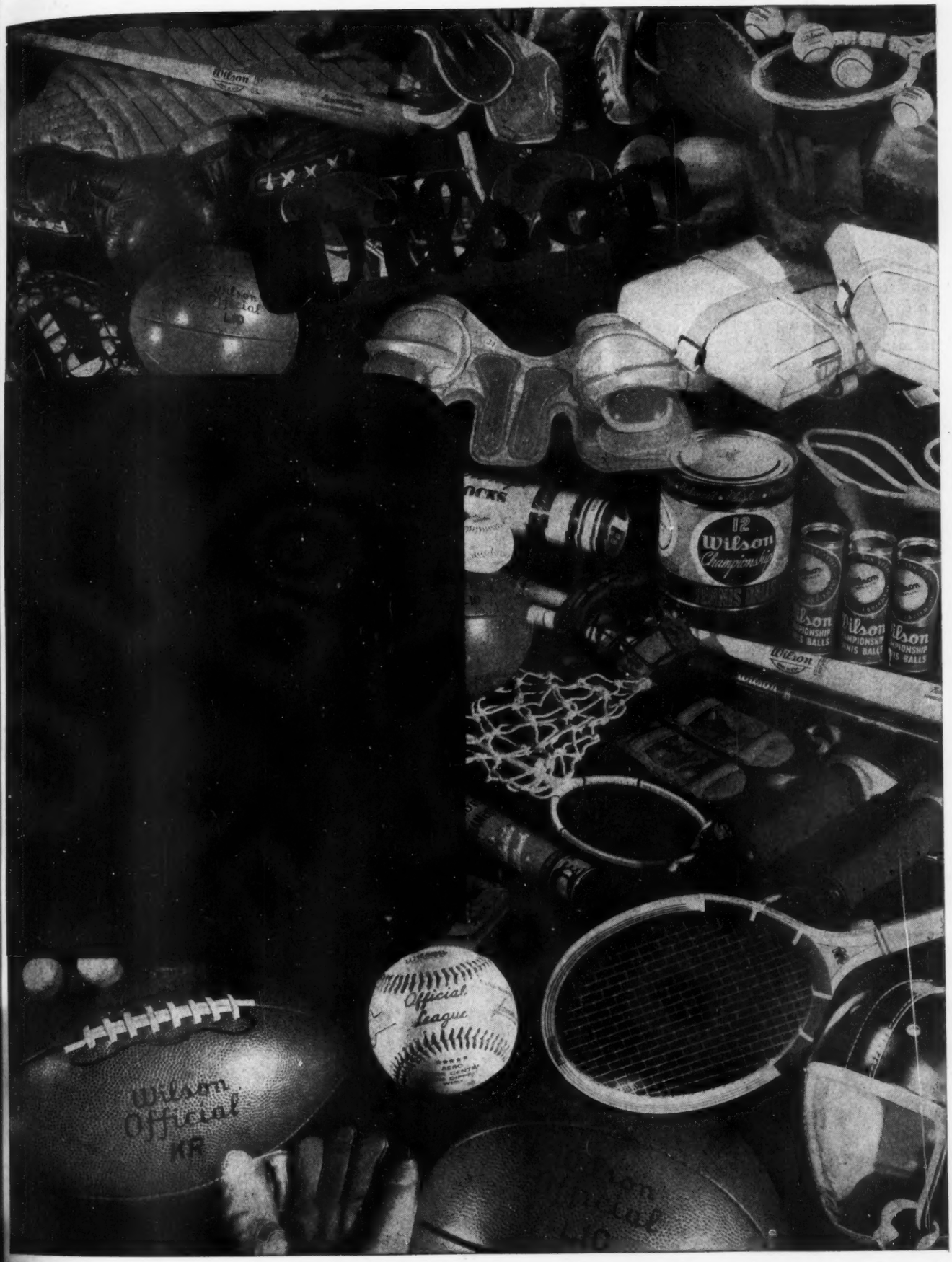
Explanation: Stage raised similar to Plan F, but large enough for required court or courts and separated from auditorium by folding partition. Auditorium of standard type with fixed seats.

Once the general arrangement has been determined, the overall size of the gymnasium may be fixed by the required court size and surrounding clear space plus the space required by folding gym seats, closed and open.

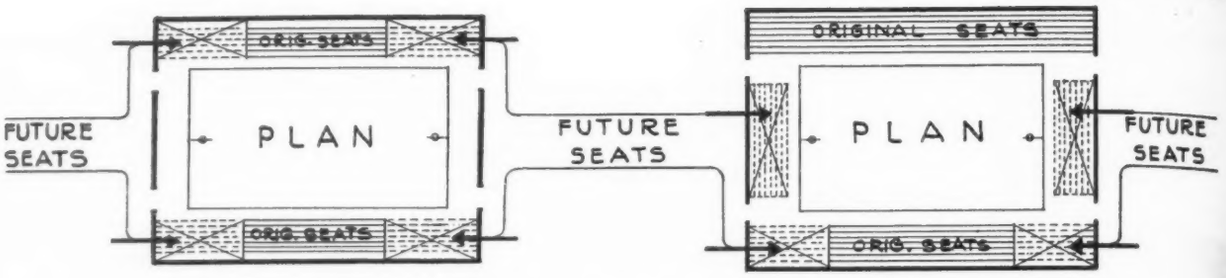
Basketball, which attracts more



***Rolling installation* in both open and closed positions with folding partition.**



IT'S WILSON TODAY IN SPORTS EQUIPMENT



PLAN FOR FUTURE SEATING REQUIREMENTS.

spectators than any other sport, dominates the court size and number of spectators. Other games may be played within such limits.

Court sizes for specific uses are determined by rules of the games. Practice courts, however, may be shorter and even narrower than standard courts. The standard sizes are as follows:

College	**94′ x 50′**
High School	**84′ x 50′**
Junior High	**74′ x 42′**
Elementary School	**60′ x 35′**

The rules state that 94′ x 50′ is maximum, and 74′ x 42′ is minimum.

Contest courts are required to have at least 3 feet clear around court boundaries. Where seats adjoin courts, the 3 feet minimum should be increased to 4 feet.

Minimum clearance around practice courts has been shown at 2′ 6″ in the drawings herein, but is not a standard.

Future seat requirements: Where the present demand for seats is less than the future possible requirements, it is desirable to provide the maximum number of rows that space will allow on both sides of the room, but for only part of the length of the side. It is impossible to add rows later. If space for end seats is available such seats could be added later.

Space requirements for seats: Manufacturers of folding gym seats have standardized row spacing to 22″ O. C. The width a person occupies is generally assumed as 16″. Aisles are generally omitted except when required by building code such as in Ohio. Aisles may be used for installations of 15 to 20 rows to provide easier access to upper rows.

Special features of folding seats: Folding gym seats have many special features that increase their usefulness. For instance, it is possible to use a 2nd row seat, equipped with a table, for score keeper or press reporter, without waste of space. This eliminates the necessity for placing a table and chair in front of the lowest seat, which creates a player's hazard.

Where corners are available for seats, mitered corner folding seats may be used which utilize the entire area without waste.

Many experts consider 2.5 sq. ft. per person the figure to use for preliminary seating requirements.

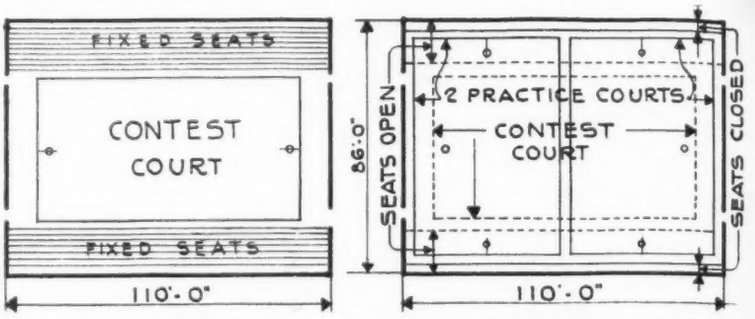
Folding gym seats come in units called sections, which are from 7′ 0″ to 16′ 0″ long. Lengths of 7′, 14′ and 16′ are standard, and other lengths are available. Sections are made with from 2 to 20 rows.

Movable folding gym seats (limited in height) may be found useful where one set of seats is to serve in several different locations. They move on special trucks or skids.

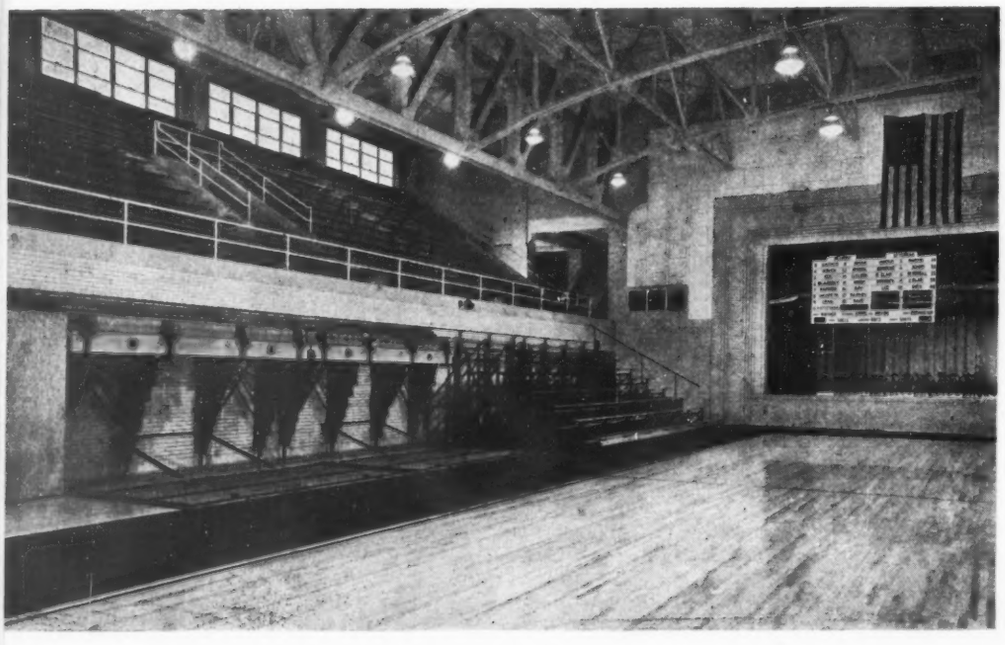
In general, folding gym seats may be grouped into two types:

The "Rolling" type made by practically all the manufacturers. The load is borne by vertical supports under each row. When empty, they roll towards the wall, on wheels. The enclosure face, in folded position, is formed either by the seat-risers or by the seats themselves. The latter type has no seat-risers and the enclosure has a sloping front. Both types of enclosures are also available in movable units.

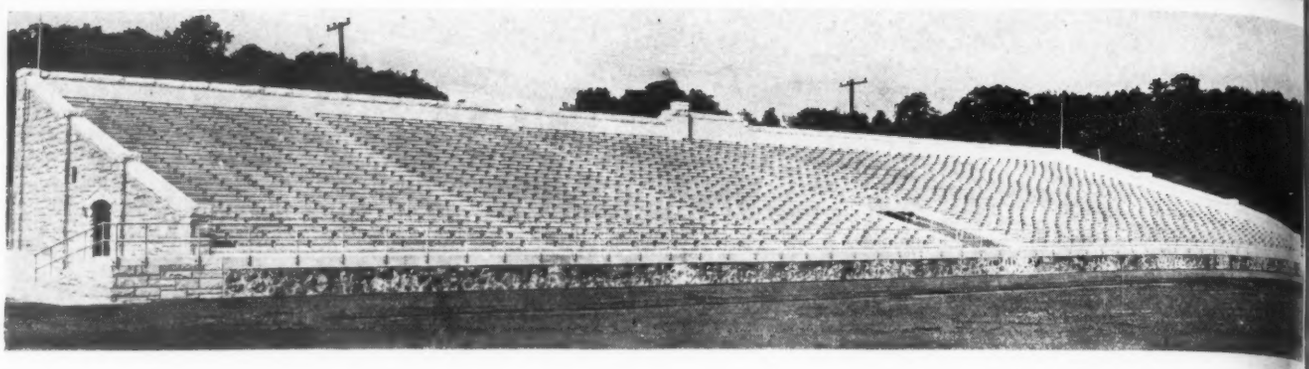
The "Folding" type, nests by folding against the wall aided by counter-balances or springs, and the enclosure front is formed by a panel resting on the floor.



FIXED SEATS FOLDING GYM SEATS



Folding type seats with sections fully opened, partly closed and fully closed.



MODERN DESIGN IN OUTDOOR SEATING

This general treatment on outdoor seating is condensed from the Portland Cement Association's excellent 32-page bulletin, "Concrete Grandstands."

SINCE grandstands are continually exposed to the weather, they should be built so that little maintenance will be required to keep them shipshape under the severest of conditions—wetting and drying, freezing and thawing.

They should also be fire-resistant and safe against damage or collapse when subject to the uncontrollable shocks caused by excited crowds.

If the grandstand is to be built in connection with a school, the number of students, faculty, alumni and local townspeople should be considered. The popularity of the school, its athletic relations with other schools and the proximity to other towns and cities influence the size. For community projects, careful consideration must be given to the drawing power of the proposed events.

The available funds also determine the size. Where funds are limited, a section of the structure may be built with a view to enlarging it later.

A survey of high school grandstands built in communities up to 50,000 population indicates that the ratio of the seating capacity to the population is larger for the smaller communities. In towns of 5,000, this ratio may be 25 percent or more, while in communities of 50,000, a ratio of 10 percent appears conservative. Using these percentages, the structures would have 1,250 seats in the one case and 5,000 seats in the other.

Many factors affect the general shape of the structure. A straight or slightly curved stand is suitable for football, track and general entertainments. For large seating capacities, two such stands can be erected on opposite sides of the playing field. Where necessary, curved sections connecting the side stands can be added to one or both ends.

Balconies have been used in a few instances to provide the largest possible percentage of seats on the two sides of the playing field.

In the case of football, a preponderance of the spectators like to sit opposite the center lines and in the lower rows. Some stands intended primarily for football have, therefore, been made much deeper at the center than at the ends.

Grandstands for baseball are built on two sides of the diamond with bleacher stands bordering the outfield for additional capacity.

Grandstands for a combination of uses are often desired. The combination of football and track has proved very satisfactory, but a combination of such uses as baseball and football requires a compromise to the disadvantage of one or the other.

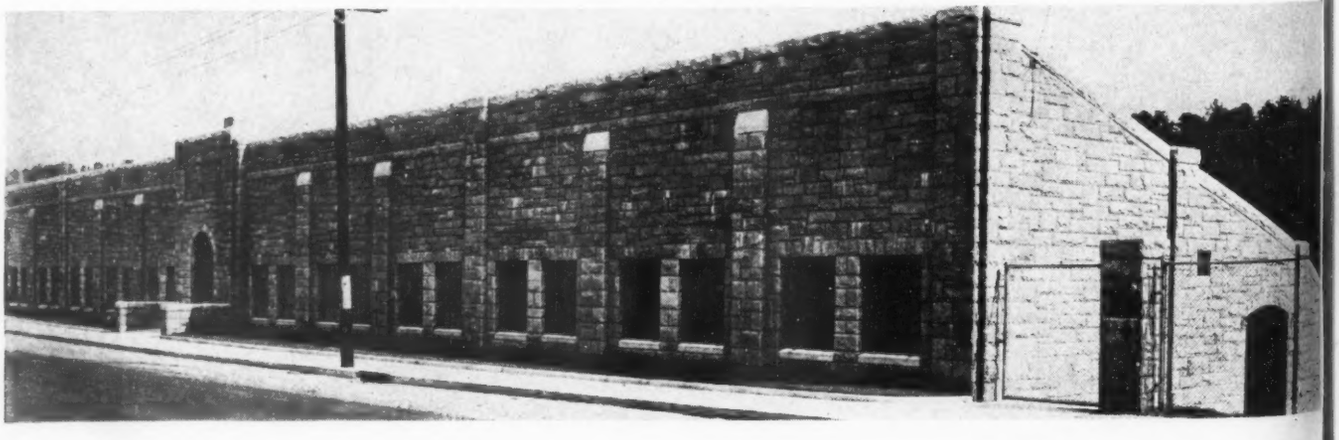
Baseball grandstands have been used for football by laying out the field with the length nearly parallel to one side of the grandstand. Football grandstands built on one side of the field have been used for baseball by placing the diamond with the first-base line practically parallel to the grandstand.

A single misplay may mean the loss of an important game, and such a misplay may be caused by the glare of the sun's rays in the player's eyes.

In planning an athletic field, therefore, one of the first considerations must be orientation of the various fields of play with respect to direction of the sun's rays. Studies of ideal orientation may determine the choice of the site for an athletic field where more than one site is under consideration. Such studies are of value in locating the seating structures to best advantage.

The direction of play in football

Stone-enclosure type grandstand (front view above) seating 4,290 people. ***(Pittsburgh-Des Moines Steel Co.)***



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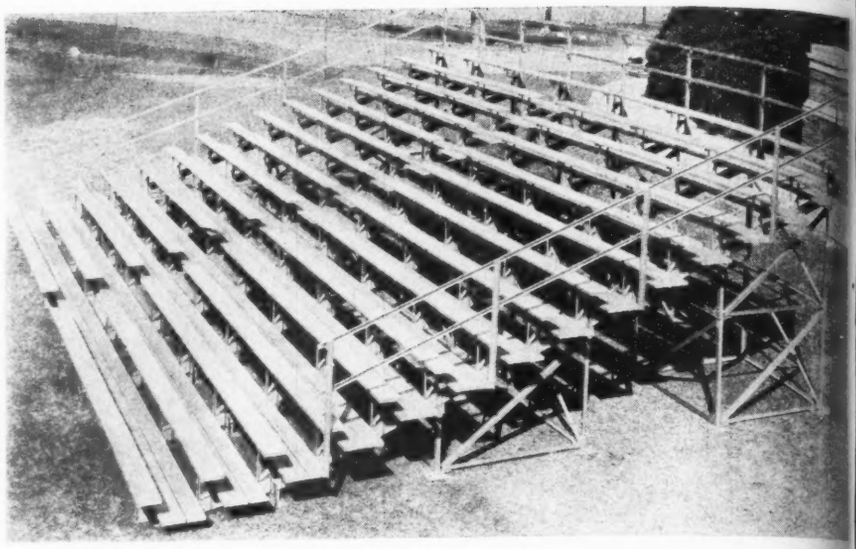
is generally in lines parallel to the long axis of the field. The football season is short, usually October and November, and games are generally from about 2:00 to 4:00 in the afternoon, so that ideal orientation of football fields can be accurately determined. The main consideration should be for the players, since spectators welcome the sun's rays at this time of year.

For baseball, conditions are generally considered most desirable when the sun's rays are parallel to the line joining first and third bases. Two positions of the diamond will meet this requirement. The season for baseball is longer and warmer than for football. Spectators generally prefer to sit along the first-base line with the sun at their backs.

Maps have been published from which the ideal orientation of football fields and baseball diamonds in any part of the United States can be determined easily. These show that for the center of the time zones, the short axis of football fields should be at an angle of about 50° east of true north.

Similarly the line from first to third base of baseball diamonds should be at an angle of about 72° east of true north for projects located near the center of the time zones. These angles increase toward the east and south of the center of each zone and decrease toward the west and north of the center by a maximum of about 8°.



One of the finest portable steel grandstands extant. ***(Wayne Iron Works)***

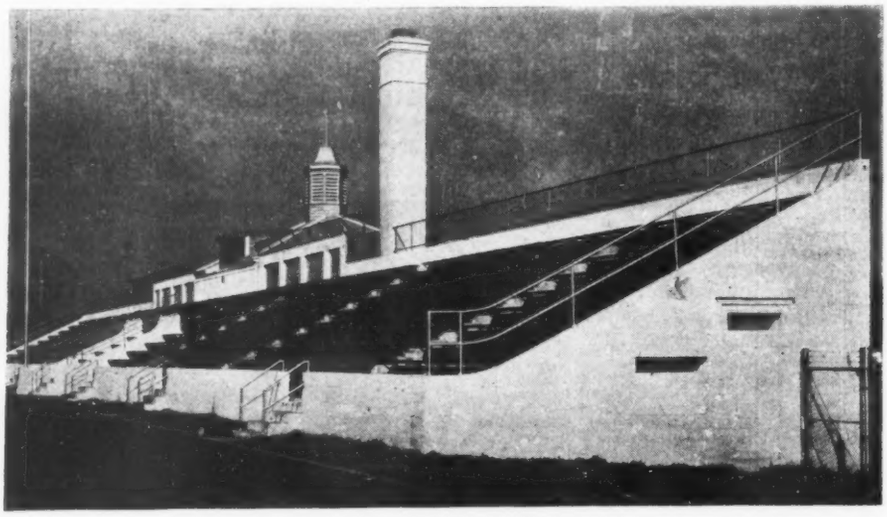
The principal purpose of a grandstand is to provide the public with a good view of the performance under comfortable conditions. The view is affected both by the distance to the action and by any obstruction to the sight line. The sight line is the straight line between the observer's eye and the object.

The center of action for football is at the center of the gridiron and that for baseball at the center of the diamond. In football, it is particularly noticeable that with unreserved seats the patrons choose seats as near the center of action as possible. This results in the outside edge of the crowd forming an approximate arc with the center on the 50-yd. line. Several grandstands have been built with the back conforming roughly to this arc.

Sight lines are generally considered only normal to the stand, the oblique lines to different parts of the field being neglected. Some stands, particularly large bowls, have been built with a curved front so that the normal line approaches the line to the center of action. The additional complexity and cost of design and construction of such curved structures is not justified with small stands.

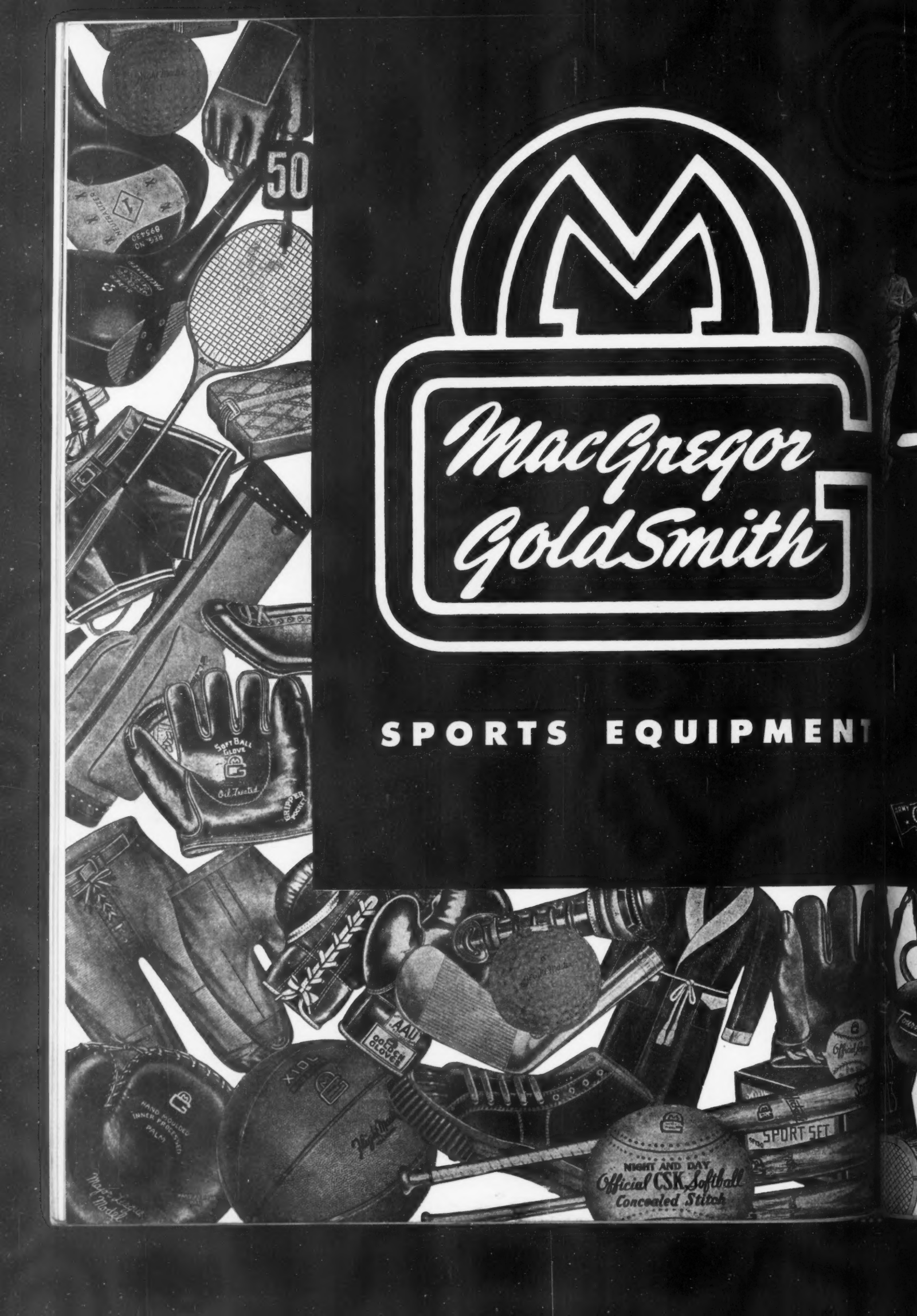
For the best view, there should be no obstruction between the spectator's eye and any part of the field of action. This requires that the sight line to any part of the field should be above the spectators in front.

It is commonly assumed that for a seated spectator the eye is 4 ft. above the floor and 6 in. below the top of his hat. Naturally these distances vary considerably with different individuals so that too great refinement in determining sight lines is not warranted when the original assumptions at best can only be approximate.



A study in concrete, permanent-type installation. ***(Portland Cement Assn.)***

The popular knockdown wooden bleacher, safe and comfortable. ***(Leavitt)***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CINDER RUNNING TRACKS

DESIGNERS of cinder tracks must pay careful attention to temperature, rainfall and soil bed. These vary greatly throughout the country. Hence, what may be considered good practice in one locality may be entirely impractical in another.

A well-constructed running track should be put down in three layers:

1. A coarse layer (about one-third), consisting of coarse rubble, stone or clinkers, leveled and heavily rolled.

2. A middle layer (one-third or more) of straight-run cinders of rather coarse grade, but without heavy clinkers. This must be well rolled.

3. The top dressing (about one-third front-end cinders is generally recommended) — a finely screened cinder mixed with clay, black loam or coal ashes.

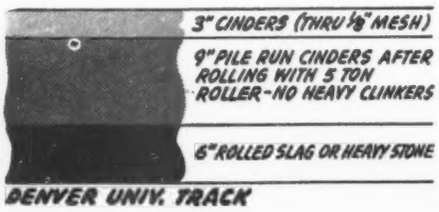
Each coach seems to have his own particular depth, screen or proportion for the top dressing.

1. Front or head-end cinders have the preference.

2. These cinders are run through a screen variously recommended at from ¼-in. to ½-in. mesh, with the preference nearer ¼-in.

3. The screened cinders are then thoroughly mixed with a binder—clay or black loam. The selection of a binder should depend upon local weather conditions, as well as peculiarities of soil. Too much soil robs the surface of resiliency; too little allows it to pack or roll. Experimentation only can solve the problem for any particular locality.

4. (a) The cinders and clay (or loam) in proper proportions, some say, should be mixed in a concrete mixer. Others advise that the top dressing of screened cinders be spread out on the track and leveled, and then the proportionate amount of clay raked in. The raking-in method is open to question, however, because of the impossibility of securing an even mixture.

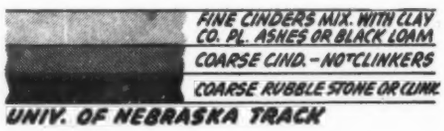


DENVER UNIV. TRACK

(b) One coach advises that, since it is easier to add clay or loam than it is to eliminate it from the top dressing, it is better to use a minimum rather than a maximum of binder. He argues that it is entirely practicable to rake into the top inch a little film of powdered clay or loam if it is needed to make the surface just right.

Several possibilities offer themselves as a bottom stratum. Crushed stone has the preference. Several men, however, question whether straight coarse cinders would not serve the purpose better.

One or two coaches have a definite preference for that material. They point out that, since the object of the rough fill is to provide a porous base to hasten drainage,



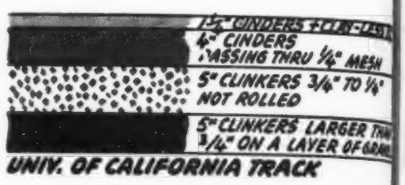
UNIV. OF NEBRASKA TRACK

cinders serve the purpose more effectively than stone, gravel, or brickbats. This part of the track should be leveled and well rolled before the intermediate stratum is put down.

The rough fill is variously estimated at from 3- to 10-in. deep. Local conditions will determine its quantity or use. At the University of Nebraska, it is entirely eliminated since the bed is almost pure sand and very permeable.

Upon the advice of architects, the only rough fill made was straight locomotive cinders, with the coarser ones worked to the bottom. The track has 18 in. of cinders on a sand bed. The top dressing of front-end cinders averages about 4 in. in depth. In putting in the main fill of cinders, care should be taken to rake the rougher clinkers to the bottom.

The middle stratum, universally it seems, is made of medium size to relatively fine cinders. After this



UNIV. OF CALIFORNIA TRACK

fill is made, it should be leveled a well rolled in preparation for t top dressing. The depth of this is variously estimated at from 5 16 in.

The necessary depth of the to fill depends upon several factors. track built in and on a non-poro soil doubtlessly should be deep than one on a porous base. So coaches insist upon a fill of 30 to in., while others suggest half th depth. It is probably true that deep track will have a longer li than a shallow track, and will livelier also.

A questionnaire brought out t following recommendations a preferences pertaining to the co struction of an arena and track:

1. The track should be a f quarter mile, measuring 12 i from the pole, with a 220-y straightaway and a one-turn qua ter mile.

2. The radius of the curve, jud ing from the replies, may be an where from 90-odd ft. to 105. M coaches preferred a true semi-circ for the curve. Others, however, ad vised the use of two curves. A illustration follows: Starting fro the straightaway on each side, 4 ft. of the curve is upon a 100.95 f radius. From that point on th curve is a segment of a true circl with a radius of 95.5 ft.

3. The width of a straightaway ranged from 21 to 30 ft., with a ma jority recommending the 30-ft. width because it eliminates the ne cessity of running so many prelim inary heats, especially in th hurdles and the sprints.

4. The backstretch and turns ranged from as low as 12 ft. to as high as 25 ft. in width; 18 ft. re ceived the greatest number of votes It is apparent, of course, that when

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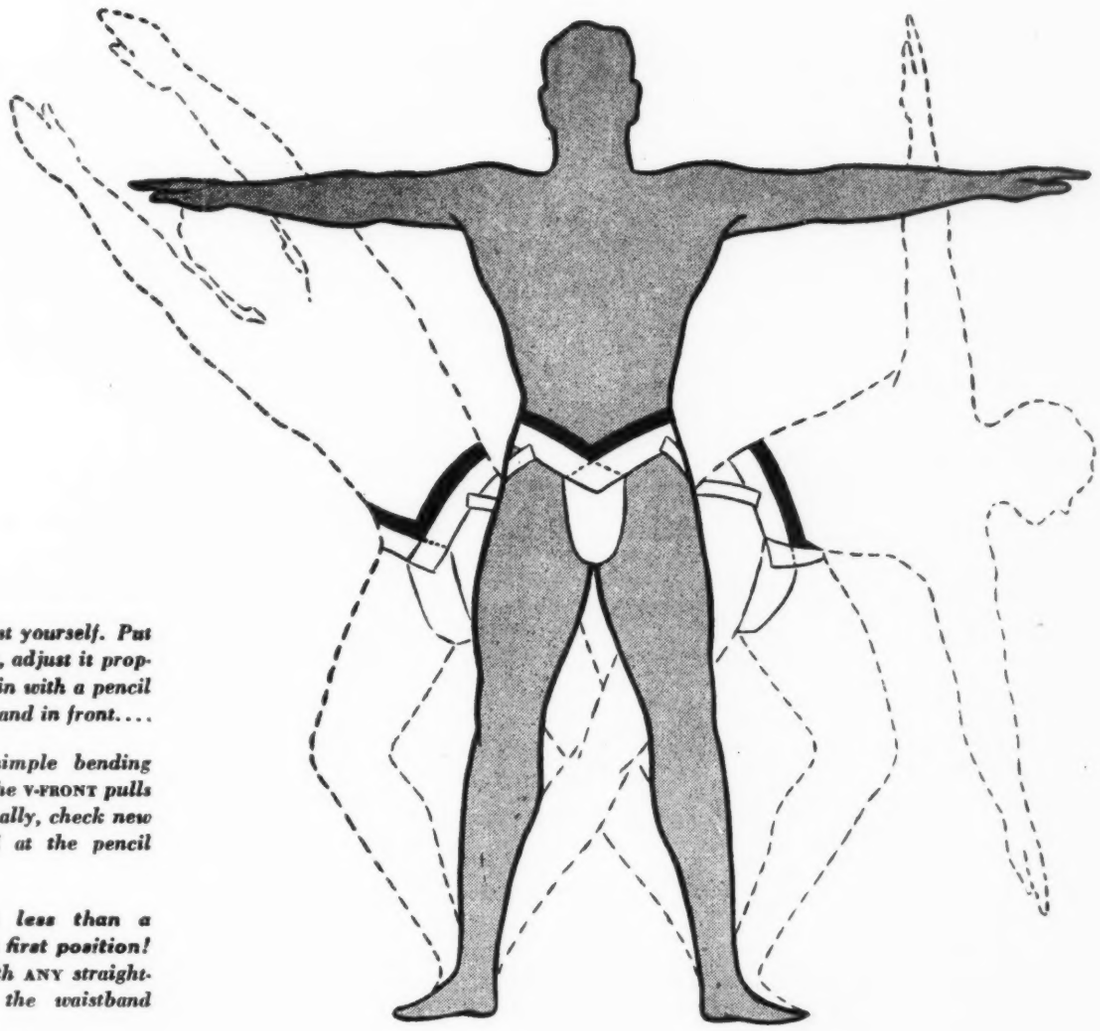

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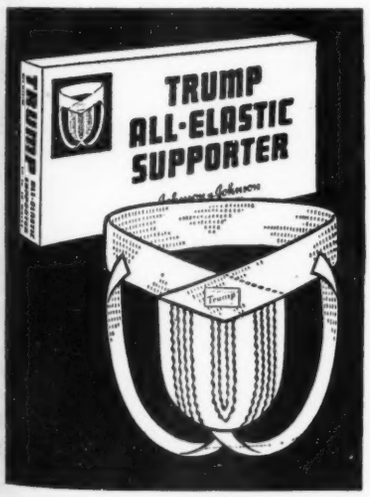
• *Then take some simple bending exercises. (Note that the* V-FRONT *pulls* UP *as well as* IN.) *Finally, check new position of waistband at the pencil mark. . . .*

• ***You will find it less than a quarter-inch from its first position!*** *(Try the same test with* ANY *straight-front supporter and the waistband slips 2 to 3 inches.)*



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the 220 yds. must be run around a turn, or the 440- or 880-yd. relays are to be run in lanes, a minimum width of 21 to 25 ft. on the backstretch and the turns is advisable.

Tracks built in heavy-rain areas should have very little elevation on turns. Owing to severe washing, a maximum slope would cause the track to lose its surface material.

While the majority of tracks have wooden curbs, there are many tracks whose outside curb on the turns is made of concrete. These concrete curbs are about 4 in. at the top and 6 to 8 in. at the base. The height of the outside curb depends upon how much the turn is banked.

The inside curb should by all means be made of wood. A concrete curb might prove a mental hazard and cause accidents.

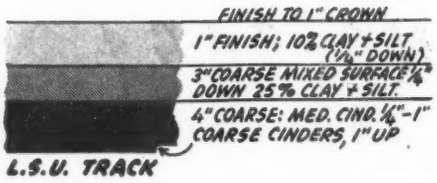
Louisiana State

LOUISIANA State University laid its plans for a new cinder track with three objectives in mind: Good drainage, firm but resilient footing and a compacted surface, sufficiently hard to be fast, but not too hard to cause injury.

Good drainage was easily obtained by following accepted engineering practice with tile drainage and run-off for storm water. A bed of well-graded cinders sufficiently deep and thoroughly compacted gave the desired footing. But the third feature was a more difficult proposition.

After extensive experimentation, it was agreed that a mixture of fine cinders passing ¼-in. mesh mixed with 15% loamy clay and 10% river silt, gave the best results.

Surfaces having less than 15% clay and silt were too soft, difficult to maintain and slow. Areas containing more than 30% clay and silt, while very fast, became too hard and held water for too long a period after rainfall.



L.S.U. TRACK

The cinders that went into the L.S.U. track were screened by a power driven rotary screen into three grades:

No. 1, passing 5/16 in. mesh, 36%
No. 2, passing 1 in. mesh, 44%
No. 3, retained on 1 in. mesh, 20%

To obtain a 12 in. total thickness, 2½ in. of the coarse No. 3 was placed on the subgrade and covered with a layer of approximately one-inch No. 2 before being compacted. Care was taken not to compact too densely. Then the rest of No. 2 was added and rolled.

The final mixed course was placed in two layers, the first 3½ in. loose measurement. Both layers were gauged by the use of four 3½-in. set screed strips placed longitudinally.

The lower surface layer consisted of the No. 1 cinders, 15% loamy clay, 10% river silt and 5 gallons of water per cubic yard of cinders, screeded on with an 8-in. channel iron 12-ft. long.

The course was thoroughly rolled and used for several weeks before the final surface was laid; being wetted, broomed and rolled at frequent intervals.

The final surface layer was similar to the lower layer except that the amount of clay and silt was reduced by one-half and the screed strips were only 1-in. thick.

Before this course was placed, the surface below was thoroughly scarified to a depth of at least 1 in. and sprinkled well with water.

In applying this process in other geographical areas, allowances should be made for climatic conditions. Where deep freezing occurs, for example, make the cinder base thicker. In excessive rainfall areas, the track must be equipped with additional drainage facilities.

The engineering details of the track itself are shown in the accompanying layout. The track consists of a quarter-mile oval with chutes 32-ft. wide at diagonally opposite ends and a soft coal cinder surfacing approximately 12-in. thick.

The chutes permit the quarter mile, 400 meters and the 400-meter hurdles events to make one turn and finish at a common point. For meets featuring a large number of competitors, heats may be run out of both chutes by using temporary markers.

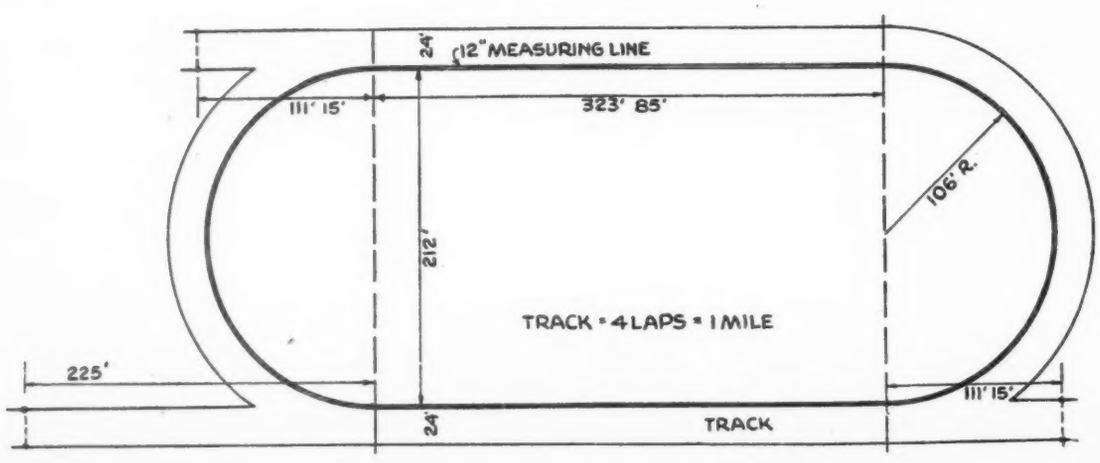
The placing of the grandstand at an angle of about 10 degrees with the track, instead of parallel, increases the visibility for spectators during short sprints, hurdles and the finish of the longer runs.

The subgrade has a side slope of 2½ in. to the center, along which is laid 4-in. drain tile in a cinder-filled trench 12-in. wide and 12-in. deep. The tile drains are connected to 8-in. drains at 50-ft. intervals, which in turn lead to a storm drain. The cross drains also serve to remove storm water from the infield and adjacent football practice fields.

For the field events, there are two vaulting pits 14 by 14 ft. and 24-in. deep at the extreme ends of two runways, which are 120-ft. long and 6-ft. wide. In the center, separating the runways, is a jumping pit 8- by 16-ft. long and 24-in. deep.

The vaulting pits are tile drained, with a layer of 6 in. of cinders and 3 in. of sand on a bottom covered with shavings. The jumping pit is also tile drained with very fine sand for a cushion.

The infield, which is used for a practice gridiron as well as for field events, was graded accurately to a parabolic curve with a 12-in. crown, and a 4-in. uniform layer



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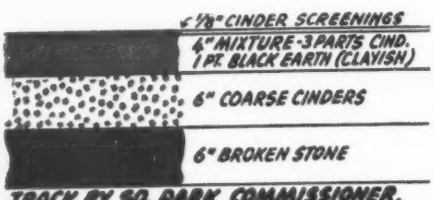
of carefully selected top soil over the surface.

Best results were obtained by screeding the soil between screed strips 15-ft. apart, instead of depending upon hand raking and leveling.

To kill any vegetation which might appear and act as a binding material, the track was treated with a saturated solution of ordinary brine.



TRACK BY SO. PARK COMMISSIONER, CHICAGO.

IN building Angel Field at Stanford University, constructor E. B. McDonald started by excavating to a depth of 26 in. below the original track surface. At this level, a sub-base was established, which was graded and rolled to a firm base. In doing this, a slope was established on the straightaways, from the center to the curb, 1 in. in 6 ft.

A 4-in. tile drain increasing in size to 6 in. at mid-distance was laid below the sub-base, 1 ft. off the curb line and in a trench 2-ft. wide. The tile pipe was incased with 1-in. size clean crushed rock and continued within 3 in. of the finish grade with larger-size stones and waste clinkers.

Upon his sub-base, McDonald placed 3 in. of base crushed rock, rolled firmly. Over this went ½ in. of screenings to fill in all voids and secure a smooth surface for the cushion layer. This was water-bound and rolled with a 2-ft. hand-roller weighing 600 lbs. The roller was used to pack all subsequent layers.

A form was constructed 8-in. wide extending across the track from curb to curb, with a space of 1½ in. between the surface and the form. In this space, picked workmen were trained to apply the redwood bark fibre cushion material at a pressure of 12 lbs.

When the process was completed, the form was lifted slightly and moved forward 6 in., leaving 2 in. of the packed fibre underneath, which provided a support for the next pack.

Attached to the rear of the form was a 1-in. strip to accurately gauge the 1-in. layer of pea gravel applied following a move of the form. This immediate application held the fibre in place.

The next layer McDonald applied consisted of 1½ in. of clay that passed through a ½-in. mesh screen. This layer was sprinkled thoroughly and permitted to dry sufficiently to roll four times.

Following the ½-in. layer of clay, McDonald put on a layer consisting of 1½ in. of clinkers, passing them through a 1 in. and retaining them on a ¼-in. mesh screen. This layer had been rolled the same way as the previous one. Watering this layer was held up until a layer consisting of 1-in. clay was spread over the ½-in. layer of clinkers, permitting the dry clay to sift in and bind the clinkers.

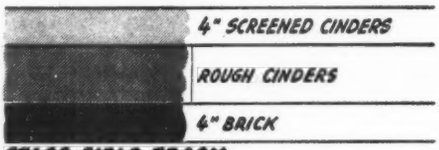
Following the application of the 1-in. layer of clay which sifted and bound the clinkers, a thorough watering was administered and permitted to dry out enough to receive the usual amount of rolling.

After the rolling, a duplicate layer of clinkers (1½ in.) was spread evenly upon the surface. This layer had been dampened to the extent that the supporting coat of clay would not become soggy.

A 2-in. layer consisting of clay and cinders was next applied. The clay and cinders were screened separately through a ¼-in. mesh screen and afterwards mixed thoroughly in the proportion of two parts clay and one part cinders.

After being sprinkled sufficiently to be dampened, this layer was rolled four times with the 600-lb. roller. At this stage of construction, water was applied gradually to permit penetration of the several layers. When dried out sufficiently, the process of rolling was duplicated.

The finishing coat was formed of 2 in. of material as in the previous layer, mixed in the proportion of five parts clay to four parts cinders. This coat was rolled and watered the same as the preceding layer, only the process was repeated several times. Two subsequent layers of ½ in. were of the same material as the finishing coat. They were applied for the purpose of perfecting the actual finish grade, which had depressed to a certain extent by rolling.



STAGG FIELD TRACK

WHEN the Chicago University groundkeeper began probing to see what lay underneath the proposed track, he found almost pure sand 20 ft. down, which was as far as he went. But he was convinced that this sand stratum went down that far again to blue clay.

His drainage problem had been fairly well solved by the glacial drag. But, nevertheless, he made and carried out elaborate plans for a surface drainage which would dispose of heavy rainfalls in quick order.

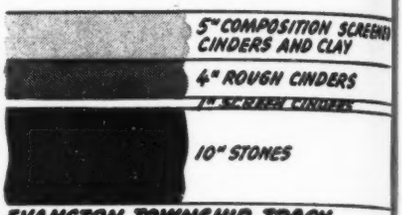
First, 14 in. of sand were excavated from the whole track and the concrete pole set. Then approximately 4 in. of brick, stones and clinkers were thrown in as base.

For the next step, 6 in. of rough-ready cinders—the rougher the better—were dumped on the 4 in. of rock and clinkers. The remaining 4 in. were filled with screened cinders. The track was carefully raked and rolled but not rolled so much that it would lose all its elasticity.

For drainage, 13 catch basins were dug inside the pole, 100 ft. apart, and each exactly 3 ft. inside the pole. Next, 10 in. below the ground, a 2-in. pipe was made to extend from each catch basin to the track.

So that a light beneficial rain or watering might not immediately be sucked from the track, steel plates were placed in the ground 10 in. down, right at the spot where the pipe from the catch basin opens into the track.

These steel plates fit snugly against the pole and do not protrude more than an inch above the ground.



EVANSTON TOWNSHIP TRACK

THE Evanston Township High School track is recognized as one of the best cinder tracks in northern Illinois. Having nothing but blue clay to build upon, and wanting to be certain the big cinders would not work their way to the top in a few years, the constructor excavated 20 in. and laid a tile pipe line running around the track with cross lines of tile connecting at intervals. The process of filling in the track was then begun.

The foundation was made up of 1[illegible] in. of stones, rocks and similar materials secured from an old stone residence. A thin 1-in. layer of screened cinders was padded on top of the 10-in. foundation, and on top of the fine cinders was dumped 4 in. of rough cinders and clinkers. The last 5 in. were made up of a composition of perfectly screened cinders and a binding of clay.

THE track at Soldier Field, Chicago, was built on filled-in land. It has a bottom layer of 6 in. of broken stone. On top of this are 6 in. of coarse cinders; then comes a 4-in. mixture of three parts cinders and one part black earth with some clay on it.

The top surface consists of ⅛ in. of very fine cinder screenings, which packs down on top of the cinder-clay composition to make a track which many regard as being second to none when it is right.

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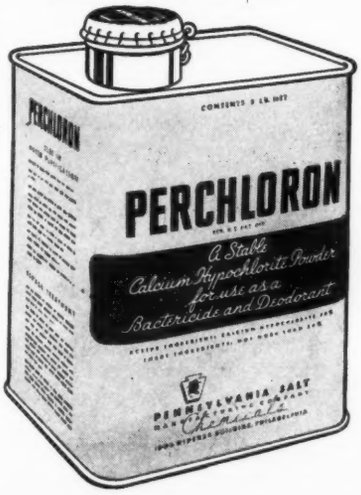

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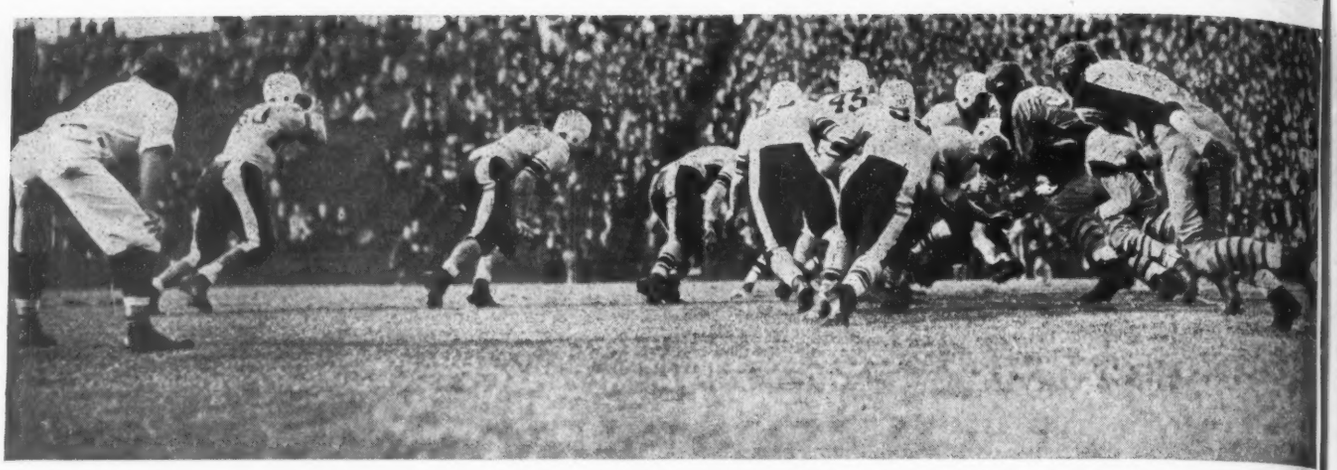


Touchdown Turf!

by Dr. John Monteith, Jr.

One of the country's foremost experts on turf, Dr. John Monteith, Jr., has been serving the War Dept. as supervisor of the development of turf for airfields, cantonments, recreation areas, etc. He was previously director of the U. S. Golf Assn. Green Section.

CAREFULLY sodded, properly groomed turf makes an unusually fine surface for athletic fields and recreation areas. It possesses many advantages over other playing surfaces. But it does have a drawback—it is difficult to maintain satisfactorily under heavy play.

Some of this difficulty stems from poor maintenance. Too often turf exists "in spite of" rather than "as a result of" the treatment it receives.

The chief difference between turf and other common surfaces is that the former is a *living* material. As you'd expect, then, various factors affect its health and vigor.

For one thing, it must be developed rapidly when climatic conditions favor its growth. And it must be protected during periods when nature is not so generously inclined.

Since turf must be developed while the area is actually in play, it is especially important to use the best cultural practices. An examination of any number of athletic fields will invariably disclose that the turf is decidedly thin.

Many of these fields represent large expenditures for grading, topsoiling, smoothing, seeding, and other constructions. This investment is seldom challenged. Yet often it is not followed through. The final objective—a perfect turf surface—isn't always attained.

Sinking a little more money into proper maintenance is a wise investment. The cost of replacing a turf surface with another type is usually many times more than the cost of proper maintenance.

One of the most essential items in the production and maintenance of satisfactory turf is adequate fertilizer. Fertilizer is to grass what an ample, well-balanced diet is to the players who use the fields. Not only should the supply of fertilizer be ample for the requirements of the turf, but the grade used should supply the soil with the plant food it needs most.

Unfortunately, the old idea of fertilizing grass was to cover it with a thick coat of stable manure. This practice could hardly be followed on an athletic field. Hence, many schools, unaware of modern practices, have refrained from using any fertilizer at all.

The modern chemical fertilizer may be used without interfering with regular play. At less expense than stable manure, it actually provides far greater and more rapid stimulation of grass growth.

No special grade of fertilizer is best for all types of soil and climatic conditions. For quick growth and replacement of worn areas, the most important element in fertilizer is nitrogen. Nitrogen also happens to be the most expensive of the common fertilizer elements. This price difference should be kept in mind in comparing different grades of available fertilizers.

The common grades of fertilizer for most agricultural crops are not the best grades for athletic fields. Grades such as a 10-6-4 (10% nitrogen, 6% phosphoric acid and 4% potash) generally give much better results on turf than the common agricultural grades containing much lower proportions of nitrogen.

The rates of application should vary with the type of soil, kind of turf, vigor of growth, type of use to which the turf is subjected, and other factors.

In general, sandy soils require more fertilizer, particularly nitrogen, than do clay or silt soils. Fields with a thick layer of high-grade topsoil require less fertilizer than fields with little or no topsoil.

As a general rule, an application of fertilizer that provides 20-40 pounds of nitrogen to the acre should be used for general maintenance on busy athletic fields. On poor soils and on even the better soils where growth is thin, it may be best to apply 80-100 pounds of nitrogen in a single season to build up a thick layer of turf. The heavier rates should be made in repeated small applications at weekly or longer intervals to avoid burning the grass.

When applying fertilizer, it is well to repeat the application on at least one test area. This particular area may be watched to determine whether additional quantities may further improve the turf.

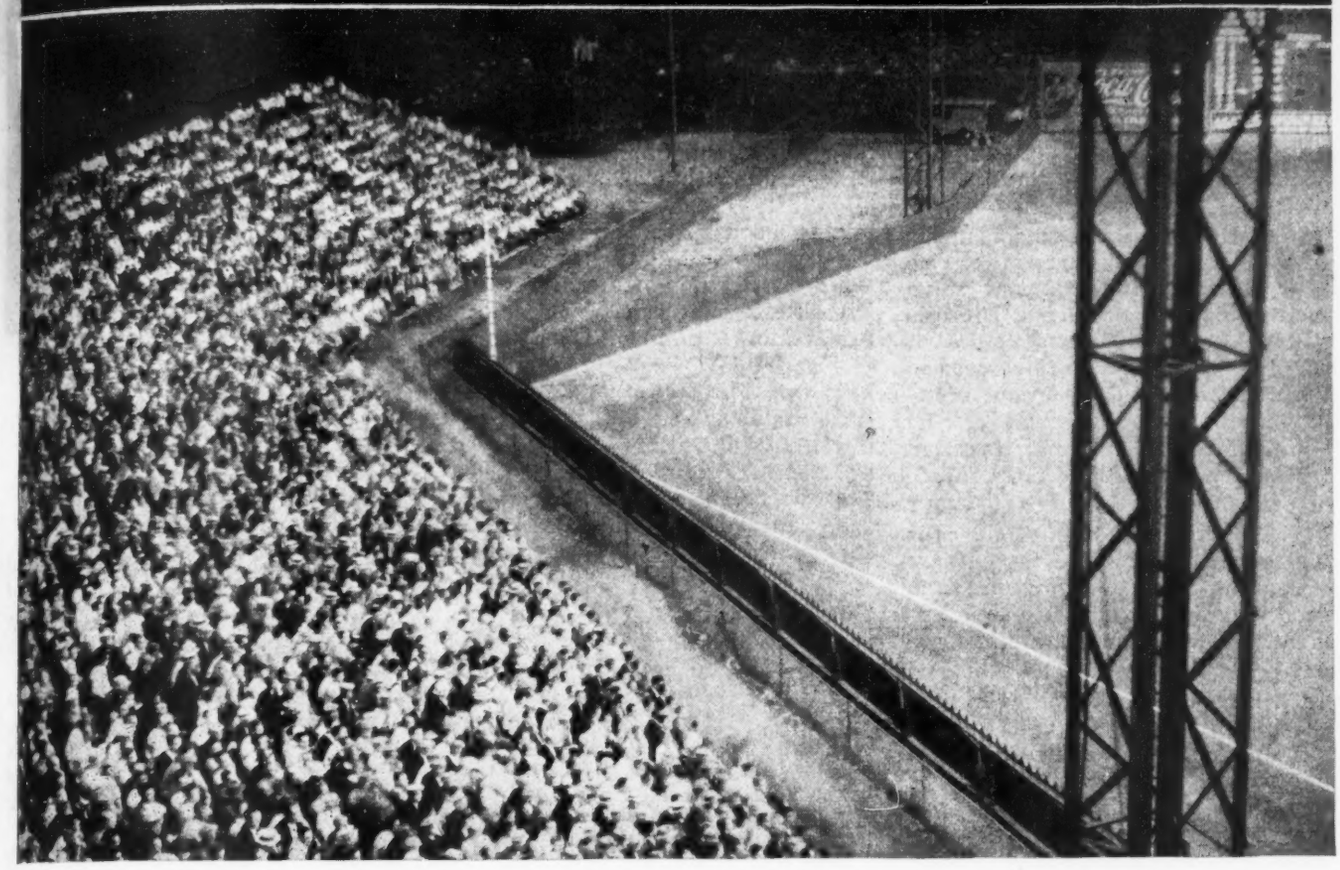
The fertilizer should always be applied at the beginning of the most active growing season—early spring or early fall in the North, and spring or early summer in the South.

Lime is one of the most commonly used materials on turf. Much of it is simply wasted. Lime actually does not help turf as much as is commonly supposed. On some fields, however, an application of one-half to one ton of lime to the acre will help thicken the turf.

Lime should never be regarded

(Concluded on page 58)

Night Games Attract More People



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CARE OF EQUIPMENT THE YEAR 'ROUND

By John Strell, Jr.

Cardinal principle to follow in preserving fabrics and leather goods is "keep your equipment clean!"

School and college administrators faced with equipment problems will find a wealth of useful pointers in this common-sense approach to the care of equipment, by John Strell, Jr., assistant to the director of physical education at the University of Illinois.

MUCH to our school men's unhappy surprise, the war's end did not solve their equipment problems. There is still a shortage. A huge store of supplies is still flowing overseas to the thousands of G.I.'s in our occupation forces. And much of the equipment now being manufactured will also go overseas to meet future demands.

The current situation thus calls for continued vigilance in the care of equipment now on hand, and good judgment in purchasing equipment that will give maximum service.

Three good rules to follow in purchasing equipment are: (1) buy the best possible, (2) buy the best lightweight equipment, and (3) buy the equipment that will give the most protection. Choose a reliable firm to insure getting the best on the market today and to insure getting deliveries on time.

A cardinal principle to follow in caring for all types of equipment, particularly fabrics and leather goods, is: *Keep your equipment clean.* This rule has a dual purpose. First, it aids in preserving equipment; and second, in cases of wearing apparel, it protects the wearer's health.

Storage of woolens

In storing woolen goods, the following steps should be observed:

1. Dry-clean all woolens; wash cottons.

2. Store in boxes or closed shelves, with either napthaline or Para-Dow as protection against moths. It is advisable to place these moth "chasers" in a little pouch and spread them throughout your storage compartment.

Leather goods such as footballs, basketballs, etc., should be cleaned with saddle soap after every period of usage. When storing, be sure the area is dry and well-ventilated to protect against mildew. The balls will deflate themselves. Do not overstock on leather or rubber supplies.

Many coaches oil footballs and other leather goods to protect them against water. Fred Stipes, the athletic-equipment impresario of the University of Illinois, has found that oil shortens the serviceability of leather goods. Arch and heel supports in football and baseball shoes require a certain amount of rigidity. Oil softens these areas and reduces protection, as well as length of service.

The best protection against moisture, Stipes avers, is a generous application of burnishing wax, applied as needed throughout the season. This wax can be obtained at any shoe shop or shoe manufacturing concern.

Tumbling mats

Tumbling and wrestling mats probably cause more concern for physical education departments than any other single item of equipment. While the initial cost of mats is high, good, conscientious care assures long life. Considering the many types of worthwhile activities conducted on mats, few better investments in equipment can be made.

Here at the University of Illinois, we're still getting good use out of mats purchased in 1921. This has been due, in no small measure, to the excellent care given them by our department and by the physical plant department, which has charge of cleaning our equipment. The following method has proved successful in keeping our mats in excellent condition:

1. Be sure all repairs, such as mending cuts and tears, sewing torn handles, etc., are made before the cleaning process is begun. This is important. If not done, soap solution will soak into felt and be difficult to remove.

2. Sweep mats free of all dust and dirt particles.

3. Dissolve soap flakes to make a very thin liquid soap.

4. Sprinkle surface of soiled mat with ordinary sprinkling can. Use clear water.

5. Immediately squeeze this water off the mat, using sponge to remove water trapped in wrinkles and tufts. These last two steps permit the fibers of the canvas to swell enough to prevent the soap from penetrating the surface of the mat.

6. Put approximately one cupful of prepared soap solution on small area of mat (two-foot width) and immediately run an electric floor scrubbing machine, or scrubbing brush, back and forth across width of mat to loosen up imbedded dirt.

7. Stop scrubbing and immediately mop up soap suds with large sponge and clear water, thoroughly removing all traces of soap.

8. Proceed on across length of mat, washing a two-foot strip and removing soap as before.

9. Finally, permit four to eight days for drying before putting mats in use.

This process yields a reasonably clean mat with no damage to felt and/or canvas. Mild soap must be used. Washing only the top surface of the mat permits the bottom surface to remain gray. The contrast encourages users to keep the top of the mats up.

The mats should be stacked face to face, so the dirty bottom side does not have contact with the clean top. Stenciled signs such as "This side up!" "Please keep clean!" "Bottom side!" have helped keep mats clean for longer periods.

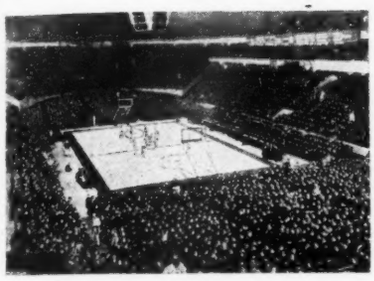
Daily sweeping

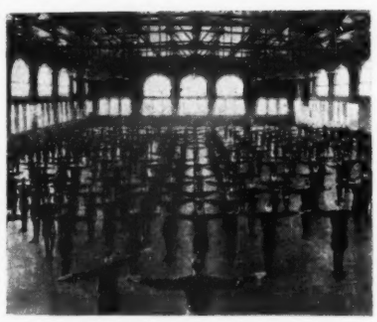
Mats should be swept daily with a stiff broom, and vacuumed once a week, if possible. Wash when needed. Do not allow participants to wear any hard-soled shoes while using mats.

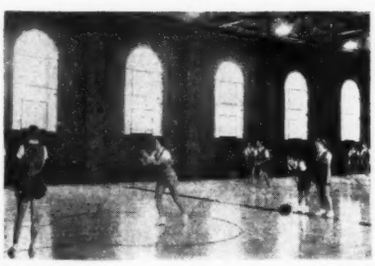
If outdoor activity precedes indoor activity where mats will be used, it is advisable to have students remove shoes, and participate in stocking feet. Never allow students to drag mats from place to place. Handles are built on all mats, and they have an obvious purpose.

Labeling equipment. Each item should be marked with a waterproof ink stamp with the school's initials, size and wearer's number. It is a good idea to list on inventory charts the wearer's number, the size, the manufacturer's catalog number, and the name of the firm from which it was purchased. Also list the year of purchase. In this way, it is easy to check up on the quality of the equipment that wears the best over a period of years.

(Continued on page 56)







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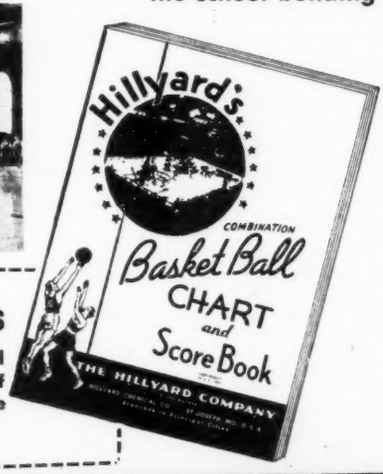

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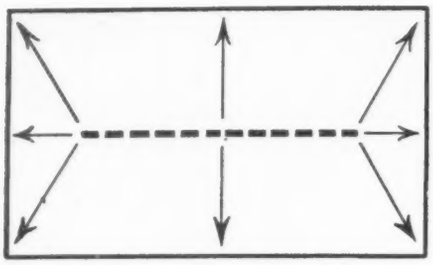
GOOD DRAINAGE PAYS



Diag. 1

GOOD drainage is a prerequisite to the successful planning, operation and maintenance of all turf fields. Without it, no end of troubles are invited and subsequently experienced.

By good drainage is meant the proper dispersion of accumulated water through controlled methods.

Let us presume you have a recreation field, the scheduled use of which has been limited from time to time, by accumulated water conditions, soggy ground, mud and similar detrimental factors.

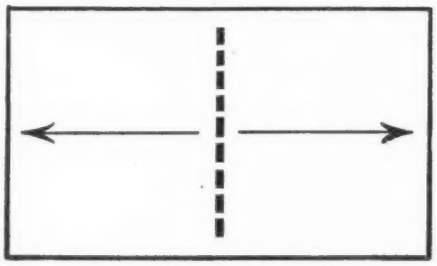
These may be due to any one or a combination of the following factors:

1. Insufficient pitch.
2. Too large an area for existing drainage.
3. Uneven surface.
4. Heavy soil with insufficient porosity.
5. Settlement of sub-soil due to improper placing or use of fill including type of material used.
6. Erosion.
7. Ground water level.
8. Subterranean movement of water.
9. Need for retaining walls to prevent movement of soil on filled areas.
10. Inadequate use of interception drains on the surface.
11. Lack of sub-surface drainage.
12. Excessive use of turf (overcrowding).

Your problem can only be determined by a thorough examination and analysis of *all* the aforementioned conditions of the site in question.

In any case, positive drainage for any *used area* must be effected. This means that the surface slope or pitch for used areas must be uniform and sufficient to remove all surface water which does not seep into the ground; frost conditions in season being excepted.

The basis for the satisfactory use of any athletic or recreation field is that it be reasonably uniform, resilient and dry. This is materially simplified where the existing terrain is comparatively level. But many sites do not offer such an easy solution.



Diag. 2

A large athletic or recreation program, requiring numerous field areas, and which is necessarily restricted to limited acreage on a *hilly* site, dictates the need for extensive planning and use.

False economy applied during the initial planning stages will result in years of distressing field conditions which, needless to say, are most discouraging and greatly retard the use of large needed areas.

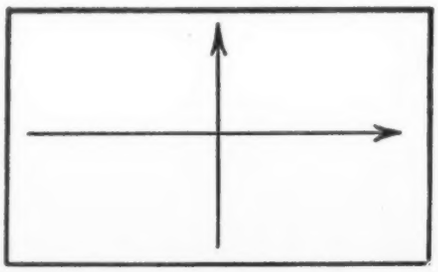
The initial savings effected by the omission of proper drainage facilities would in a few years appear negligible compared to the added cost of maintenance and operation, etc.

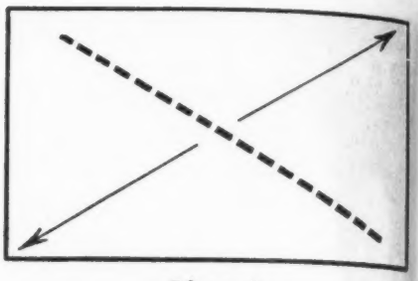
Add to that the criticism, great disappointment and unfavorable psychological reactions adverse field conditions create, and you will find yourself literally "in the soup."

Only by the engagement of qualified land planners *experienced* in this type of activity can satisfactory results be obtained.

A. Carl Stelling, a distinguished landscape architect who specializes in designing outdoor sports plants, offers a few general suggestions for improving your drainage systems.

by A. CARL STELLING





Diag. 3

Where other activities such as buildings, sanitary and electrical, and other facilities are being planned, the building architect, landscape architect and professional engineer must collaborate on the overall planning of all facilities projected.

It is imperative that these professional advisors be brought together at the very inception of the project. Only through such collaboration can a comprehensive and cohesive plan produce outstanding results.

There are three ways a field can be drained effectively and efficiently. These are as follows:

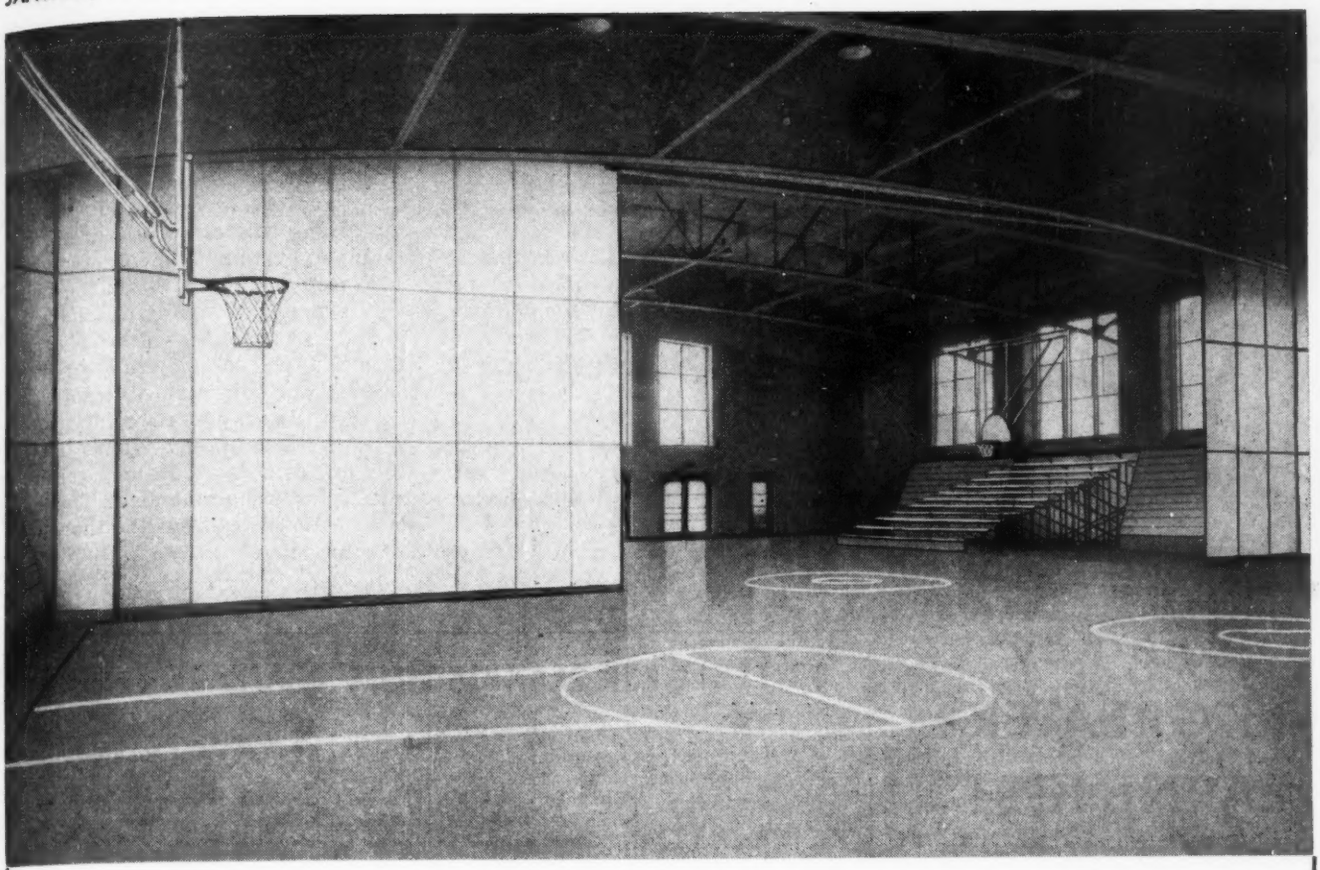
1. From center line of field toward all four sides (where a track surrounds a football field, the so-called "turtle-back" or "hog-back" method is used).
2. From the center line of field toward the ends.
3. From the diagonal towards each side. This method may sometimes be deemed expedient when economy is essential. It is *not* the quickest and most efficient method, as the surface water has to travel over a larger area, taking a longer time and thus increasing possible saturation of the soil. An exception to this would be a field with porus (sandy) soil providing for quick seepage.

Diag. 1 illustrates in outline the most desirable method of grading an athletic field within the perimeter of a quarter mile track. It is the so-called "turtle-back" or "hog-back" method previously referred to. It demonstrates the quickest and shortest way of disposing surface water.

The field has a straight (but unnoticeable) ridge along the center, and slopes away on each side toward the track.

It is essential that all surface water be intercepted and disposed of before reaching its inside perimeter. This is done by the use of "swales" leading to drainage basins.

Diag. 2 illustrates the surface pitch in one diagonal direction



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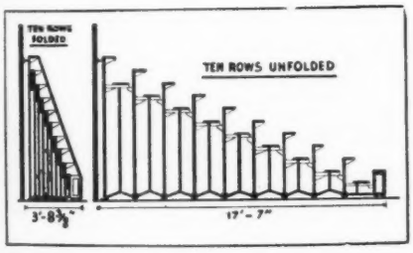

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(theoretically) over the entire field. This does not permit the most efficient and quick disposal of surface water as it has to travel over a greater area than indicated under Diag. 1.

It may prove satisfactory under soil conditions ideally suited thereto, but it is considered inadvisable if a track is included. A track should be generally level all around. Therefore, a high point on one side of the athletic field inside the track and a low point on the other side would not contribute to the economic use of the field.

Diag. 3 illustrates the surface pitch in two directions away from diagonal line. Again, this method of grading a field does not lend itself to the inclusion of a running track around it. Without the track it is quite possible that site conditions and general economy would warrant a pitch diagonally away from the ridge which is very similar to the principle demonstrated under Diag. 1.

Site factors, including sub-surface conditions, dictate the sub-surface drainage system. The following criteria apply pertinently in the planning. (See accompanying chart.)

Salt glazed tile of the bell and spigot type is generally recommended for sub-surface drainage.

Farm tile may be used for reasons of extreme economy where a solid and uniform foundation is assured, but is not recommended. The bottom of the trench must be thoroughly compacted.

CRITERIA FOR PLANNING THE DRAINAGE SYSTEM

A General Top Soil & Sub-Soil Conditions.	*Level Site*	*Sloping Site*	*Steep Site*
1. Porous	Grading and pitch minimized; sub-surf drainage may not be essential.	Grading increases; pitch minimized; intercepting culverts or surface drains needed to prevent soil erosion. Sub-surface drains minimized.	Gradient determined by economy, size of areas. Intercepting culverts or surface drains needed to prevent soil erosion. Sub-surface drains required, as well as buttress or retaining walls to prevent soil movement.
2. Clay or Hard	Maximum gradient and sub-surface drainage needed.	Maximum gradient, intercepting culverts or surface drains, sub-surface drainage required.	Maximum gradient, intercepting culverts, surface drains, sub-surf drains required. Buttress or retaining walls may be required to prevent movement of soil.
B Existing Ground Water Level	Advisable to maintain finished grade elevations a minimum of 4' above ground water level; sub-surf drains should never be less than 2' below finished grade or 2' above ground water level.	Immaterial, except as it affects sub-surface drains and culverts.	Immaterial, except as it affects sub-surface drains and culverts.
C Size of Area to be Drained	The larger the area the more essential is proper drainage.		
D Relation to Adjacent Property, Buildings, etc.; & Final Disposal	Provision for sub-surface and surface drainage to and from adjacent areas and/or buildings is essential. Adjacent areas must be protected against all abnormal or concentrated water conditions from site.		
E Rainfall and Climate	The average and maximum rainfalls of the locality should be taken into consideration, as this affects all provisions heretofore made.		
F Anticipated Problems or Changes	All surface and sub-surface drainage plans should provide for possible extensions of site, new buildings and/or adjacent changes to properties as they may affect them.		

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Here's good news! Production on Basketball Shoes with "P-F" and with Brown "Non-Marking" molded soles has started. These shoes will be distributed to retailers starting the latter part of January, with quantities increasing as manufacturing progresses.

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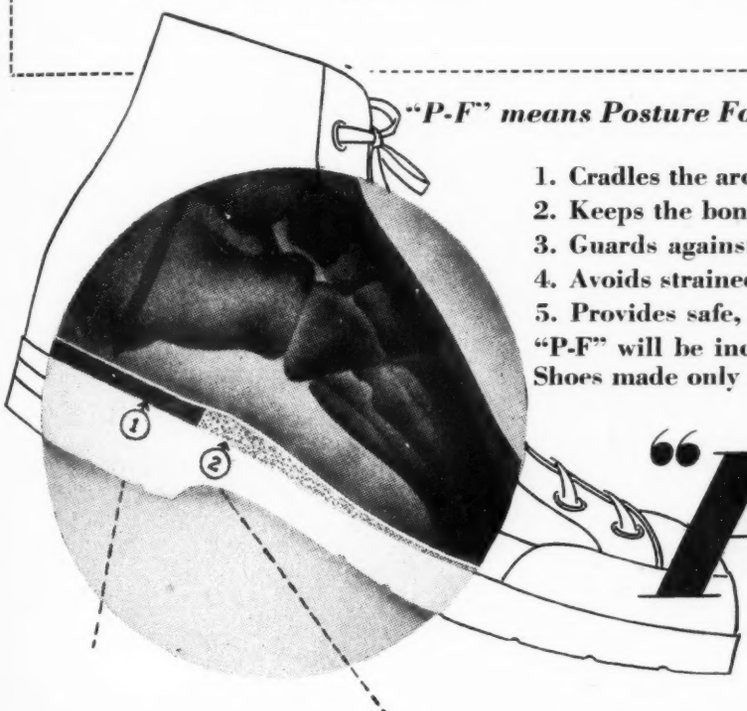

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Cheerful Light!

by G. W. Frederick

There will be lots of light in the gym of the future—and it will probably be of a fluorescent nature. Economical, of unusually low brightness, the fluorescent unit provides all the light you need, eliminates glare and makes for a cheerful atmosphere. While you can install such units without completely rewiring your present installations, it should be remembered that fluorescent layouts operate best at mounting heights up to 30 feet and, being more fragile than incandescent filament lamps, demand more protection.

LIGHT plays an important part in creating a cheerful atmosphere. And there is no area in which a cheerful atmosphere is more important than where people seek recreation. Here their mood is one of expected enjoyment. The surroundings, hence, should be pleasant and encouraging, not dark and gloomy.

Bowling alleys, swimming pools, basketball floors, handball courts, horseshoe courts, table-tennis rooms, and squash courts are all the more popular when properly flooded with plenty of light. Shadowy corners disappear and an air of cheerfulness and cleanliness predominates.

Now with prewar building materials again becoming available, and with versatile fluorescent lamps ready to give you the latest in efficient illumination, the opportunity for constructive planning and action is here.

The gymnasium has had its lighting future settled by the numerous high-bay lighting installations that were perfected during the war for industrial plants, and which produce abundant, uniform illumination.

The attendance-drawing power of increased illumination, as evidenced by night football, can now be applied to indoor basketball through use of the fluorescent lamp.

With its definite advantage over the concentrated high-wattage incandescent lamp in having a much lower surface brightness, the fluorescent lamp is ideally suited to a game in which the players are forced to look up for the ball or at the basket, directly into the light sources.

While the fluorescent lamp represents a reduction in visible brightness of 54 to 1, over the incandescent lamp, the new low-brightness, 60-inch, 40-watt fluorescent lamp is an additional step in the same direction. This lamp is only 45 percent as bright as the standard 40-watt fluorescent lamp or less than one-hundredth as bright as the high-wattage incandescent lamp normally used.

With fluorescent lamps connected to two-lamp ballasts or operated on the various phases of a three-phase line, there is no appreciable stroboscopic effect to confuse the ball-handler. When installed at a reasonable height, these installations are rarely struck by flying basketballs. But in gyms where softball is practiced, the units should be caged.

These lamps, in two-lamp industrial-type fixtures, mounted close to the ceiling or to overhead girders, provide a very uniform illumination which is pleasant for the contestants and flattering to the apparel and complexions of the spectators.

Swimming pools

Incandescent lamps in well-designed floodlight reflectors continue to be the most effective units for underwater use in the lighting of swimming pools. But the overhead fixtures to light the pool walkways and the spectator section may well be of the fluorescent type.

Underwater lights are necessary to eliminate the surface reflections caused by overhead illumination. These underwater units may be of either the wet-niche or dry-niche type and should always be combined with suitable overhead fixtures.

Lighting of the water relieves the dark forbidding appearance of some pools, and makes it much easier to spot swimmers in distress. It also aids the viewing of sub-surface aquabatics and gives the pool a generally attractive appearance. If color filters are used, the pool can be turned into a striking showplace for special events.

Dry-niche units are units mounted behind a waterproof window recessed into the side wall of the pool. These units are serviced from above through manholes, or from the back if a tunnel around the pool provides access to this area. Wet-niche units are waterproof floodlights which are placed, manually, into small recesses in the side wall of the pool. They are lifted out of the water for servicing.

Floodlights can be placed close to the surface of the water, but their complete submergence is essential. It is also essential to reduce to a minimum any stray light which might cause uncomfortable glare in the eyes of persons seated along the edge of the pool.

To make the most of these underwater installations, the pool sides and bottom should be daubed with a very light paint to reflect as much of the light as possible. Spread lenses on the floodlights will give the necessary horizontal spread.

In installing the overhead fixtures to provide illumination around the pool, care should be taken to avoid locating the units over the water where glass breakage would fall into the pool and necessitate its drainage.

(Concluded on page 42)

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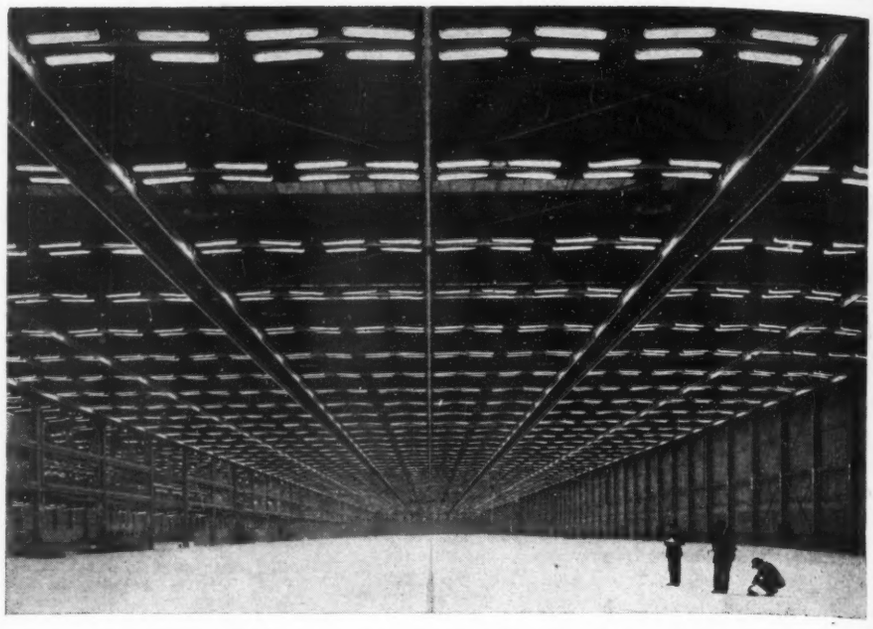


Fluorescent lights serve huge industrial and rec sheds, too!

The opportunities for improving the appearance of a natatorium through the intelligent use of modern lighting are innumerable. The trend has been toward a cavern-like effect, making the area seem cramped and uncomfortable. The units around a pool are subjected to high humidity, and, in many cases, to an ambient temperature slightly higher than normal.

Here, if fluorescent lamps are used, the new "high-humidity" lamps should be installed. This lamp has been developed to operate reliably in atmosphere of high-humidity, where standard fluorescent units may experience some starting difficulty.

More than in any other place of amusement, fluorescent lamps have invaded the bowling alleys. The new recreation centers, built during the war for hard-working industrial soldiers, are well-known for their eye-catching applications of these light sources.

In all types of arrangements and fixtures, from bare lamps to hidden reflectors, the fluorescent units have greatly increased the illumination on the alleys and pins and brightened the entire room.

One popular method of lighting alleys consists of placing regular fluorescent lamps in fixtures of diffusing glass over the area occupied by the bowlers and illuminating the alley proper with industrial fluorescent fixtures placed cross-wise to the alley behind valences to prevent them from interfering with the line-of-sight to the pins.

This same idea has been used in a slightly different way with accoustical ceilings built in saw-tooth fashion. The fluorescent fixtures, directed down the alley, are hidden by the sloping portion of the saw-tooth.

The fluorescent principle has also been applied to sunlamps. A new fluorescent-type sunlamp, to be available in 20- and 40-watt sizes, makes use of a new phosphor which emits beneficial skin-reddening (erythemal) and tanning ultraviolet energy instead of visible light.

These lamps, which may be substituted for any standard 20- or 40-watt fluorescent lamp—as they require the same auxiliary equipment —are estimated to be fifteen times as effective in producing erythemal energy as the well-known S-1 sunlamp.

A reflector sunlamp now on the market furnishes health-giving ultraviolet energy from a high-pressure mercury arc, and operates without the necessity of the auxiliary equipment common to gaseous discharge lamps. This lamp may be screwed into any 115-volt alternating current socket. It has its own reflector in the form of the aluminized glass bulb in which the mercury tube is mounted.

Sprains and charley-horses may be treated with a reflector heat lamp, designed to produce its maximum emission in the region of infrared radiation most effective in warming the body.

While this discussion has limited itself to those techniques and units specifically applicable to places of recreation, the possibilities in utilizing light to maintain a cheerful and pleasant atmosphere do not end here.

STANDARDS FOR HEALTH FACILITIES

By Dr. Karl W. Bookwalter

The Indiana educator offers a method of formulating a uniform code of principles for phys ed facilities

Dr. Karl W. Bookwalter, assistant professor in the School of Education at Indiana University, is chairman of the Joint Committee for Standards for Physical Education and Athletics. He assumes sole and personal responsibility for the opinions expressed in his article.

ALTHOUGH the importance of physical education and athletics is now firmly rooted in the consciousness of America, there still exists a paucity of scientific information on standards for facilities.

Upon close scrutiny of the available literature, you find:

1. No one source covers the whole field adequately.
2. A marked variability in specific standards.
3. Conflicting qualitative recommendations.
4. Supposed authorities quoting earlier, even less authoritative sources.

In 200-odd references gleaned on the elementary school level, a marked variability was discovered in specifications. One example will suffice: In recommending a size for the elementary school gym, one reference quotes 25 ft. by 60 ft. Another offers 100 ft. by 170 ft.

Much of such discrepancy may be attributed to ambiguity in the references. But this in itself is a fault.

In some references the combined auditorium-gymnasium is recommended as an economical and satisfactory facility. In others, it is soundly criticized. Similar disagreement is found in the matter of where to place a drinking fountain, and so on.

As to the validity of references, one amusing discovery will indicate the problem involved. A good reference was found on service facilities for public school physical education. Upon closer inspection, this reference proved to be largely a series of quotations from a few primary (?) sources.

One college source in particular was freely and properly quoted by a certain organization. A later analysis revealed that the source gave due credit to an earlier work by the organization doing the quoting! Thus, 23 years later, the snake is swallowing his tail. What an inadequate diet!

To help arrive at a uniform set of standards, a joint committee of outstanding educators has undertaken an intensive research. Four national organizations, possibly seven doctoral studies and some 150 jury members are involved.

To indicate the care with which this study is being made and to define the limits of the study, an outline of the procedure for the elementary school level follows.

Need for the Study

The need for the study is evidenced by: the impending surge in building for schools, the absence of adequate standards in the literature, national requests for assistance, urgent appeals for early publication of standards, willing response of national organizations and leaders to requests for guidance, existing organization committees for similar purposes, and grant of funds by two organizations for this and similar studies on other levels.

By facilities are meant the permanent spaces, structures, and fixtures essential for the effective functioning of the school health education and physical education programs.

For the purpose of this study facilities shall consist of three phases:

1. *Administrative facilities* — such spaces, structures, and fixtures intended primarily for the school directorial, instructional, and maintenance personnel.

2. *Instructional and recreational facilities*—spaces, structures, and fixtures intended primarily for the instruction of and recreational use by the pupils.

3. *Service facilities*—spaces, structures, and fixtures intended primarily for the health, comfort, and convenience of the pupils and other personnel who utilize the other health and physical education facilities.

4. *Unit of facility*—one space or structure of a particular phase of facility, e.g., classroom, gymnasium, playground, office, locker-room, shower-room, storeroom.

5. *Criteria*—specifications or characteristics such as size, number, color, flooring, fencing, lighting, heating, ventilation, surface, and arrangement which render a unit of facility adequate, safe, hygienic, and convenient to use.

6. *Principle*—a guiding rule for the planning, use, construction, and maintenance of facilities for a specific program for particular purposes, e.g.

a. *Accessibility.* Facilities should be readily, conveniently and directly available to the proper groups.

b. *Beauty.* Facilities should be attractive but not gaudy and should inspire appreciative treatment and care.

c. *Departmentalization.* Related areas and groups should be in a functionally related unit suite or department.

d. *Economy.* Cost in money, time, and energy of the construction, use, and maintenance of health and physical education plant should be kept at a minimum compatible with effective instruction and with maximum wholesome participation.

e. *Expandability and Flexibility.* Increase in range and amount of activities should be readily and economically possible.

f. *Isolation.* The *elimination* of odors, noises, and moisture; the *segregation* of activity groups and the *exclusion* of undesirable persons from all areas concerned should be automatic and effective.

g. *Safety, hygiene, and sanitation.* Due consideration must be given to the safety, hygiene, and sanitation of plant and participants in the provision, arrangement, and maintenance of facilities.

h. *Supervision.* The oversight, control, and management of activities and groups should be facilitated by visibility, convenience, and access.

i. *Utility.* Adaptability of areas to multiple use by activity groups, within the limits of safe, pleasant, and effective instruction, enhances their usefulness.

j. *Validity.* To be adequate, facilities must be in accord with curricular needs, scientific facts, legal requirements, and interscholastic sports rules.

7. *Standard.* An authoritative and acceptable degree of quantity or quality for a specific criterion of a unit.

8. *Elementary School.* Shall consist of the first six grades as a rule. If two or more grades of junior high school level (7 and 8 or 7, 8, and 9) are included then the standards should be those of the junior high school.

Sub-Problems

ESTABLISHING policies concerning breadth and depth of study, basic procedures, and form of final publication.

What We Need to Know

Authoritative opinions as to what the limitations should be.

a. As to curricular scope in related fields: (1) Health education, (2) Physical education, (3) Athletics, (4) Recreation.

b. Disparate needs for each sex: (1) Boys, (2) Girls.

Where to Get the Information

From existing committees of workers of national reputation.

a. Joint Committee of NCAA, AAHPE&R, CPEA for Standards for Facilities in Physical Education and Athletics: K. Bookwalter, R. Duncan, W. Hughes, W. La Porte, F. Luehring, J. Nash, D. Oberteuffer, F. Stafford, W. Streit.

b. A.A.H.P.E.&R. Committee for

These Coaches Know Oatmeal Leads Other Natural Cereals in 3 Vital Elements Every Athlete Needs!

Crisler *Devore* *Rupp* *Price*

Read Why Famous Coaches Recommend Quaker Oats

Great coaches, one after another, are enthusiastic in their support of a hot Quaker Oats breakfast. They know it is a scientific fact that whole-grain oatmeal leads all other natural cereals in three important elements that all athletes need!

When you tell your men to eat Quaker Oats, you help them fight fatigue, since oatmeal leads all other natural cereals in Vitamin B_1, the anti-fatigue vitamin, just as it leads in Protein, main element of meat, and in *Food-Energy* itself! That's why famous coaches like to have their players make a regular habit of Quaker Oats breakfasts!

For stamina and energy . . . recommend Quaker Oats to your athletes . . . and enjoy delicious hot Quaker Oats breakfasts every morning yourself!

Quaker and Mother's Oats Are the Same

Quaker Oats

WORLD'S BEST-TASTING BREAKFAST FOOD

Standards for Facilities: W. Streit, V. Blanchard, C. Glenn, L. Gregg, E. Henderson, C. Horton, R. Houston, C. Langton, W. Uhler, V. Watts.

c. N.S.W.A. Research Committee: R. Abernathy, C. Bookwalter, I. Boulten, E. French, D. LaSalle, P. O'Keefe, G. Scott, E. Metheny.

d. Other consultants: D. Boettjer, C. Bookwalter, K. Bookwalter, C. Dane, J. Morton, V. Schooler, P. Van Horn.

e. Consultants from national offices: Ray Hamon, Chief Specialist in School Building, U. S. Office of Education—Frank S. Stafford, Chief, Physical Education, U. S. Office of Education—Ben Miller, Ex. Sect., A.A.H.P.E.&R.

How to Get the Information

By questionnaires and correspondence:

a. Periodic reports of progress with query sheet accompanying.

b. Correspondence with individual numbers.

Organization and Analysis

All questionnaires will be formulated after consultation and discussion with all workers in the several companion studies. Questionnaire results will be tabulated and workers will be guided by the concensus thus obtained.

Conclusions

Acceptable policies for determining nature and scope of final publications.

DETERMINING existing standards for facilities.

What are present written recommendations for?

a. Administrative, instructional, recreational, and service units of facilities.

b. Criteria related to same.

c. Standards for each criterion.

From the literature subsequent to 1920.

a. Text-books in physical education.

b. Educational and physical educational score cards and standards for school buildings and facilities.

c. Educational and professional periodicals.

d. Commercial brochures and other publications.

e. Special committee reports on surfacing, lighting, facilities, etc.

By gleaning the literature; standards for sources:

1. Nothing earlier than 1920.

2. Wherever possible use the original source.

3. If book quotes other source with which the author is in agreement, use both the book and the source material.

4. Where author quotes conflicting sources and does not draw conclusions from the conflict, do not use the conflicting report.

5. If the author quotes conflicting opinions and then draws a conclusion, use this conclusion as his vote.

6. When commercial literature is the only source of reference concerning an item, disregard that item; if other sources refer to the item, use the commercial literature for detail on how much, how many, what size, etc.

7. Do not use source concerning specific levels other than your own unless the treatment is general and applicable.

Card file will be indexed and organized as follows:

I. Principles: Accessibility, economy, supervision, etc. Each principle documented.

II. Administrative Facilities: A. Office (for example)—Criterion 1. (Size-example) 12′ x 20′ for example Documentation (1), etc. Criterion 2. (Lighting—for example), etc.

III. Instructional Facilities: A. Classroom (for example) — Criterion 1. (Floor—for example) Maple—for example, Documentation (1), etc.

IV. Service Facilities: A. Locker-room (for example) — Criterion 1. (Lighting—for example) 5 ft. candles —for example. Documentation (1), etc.

V. Contra-indicated and Desirable Features:

A. Gym-auditorium is not desirable. Documentation (1), etc.

B. Kitchen off gymnasium is desirable. Documentation (1), etc.

Documentation of above cards to indicate authenticity, recency, frequency.

A check list of administrative, instructional and recreative, and service facility units with varying standards for all criteria thereof.

FORMULATING acceptable standards.

What standards do contemporary leaders in the field hold to be acceptable in light of: a. Personal experience, b. Written recommendations above.

From the opinions of an acceptable jury of workers in the field.

a. Society of State Directors (membership).

b. Society of City Directors (membership).

c. College Physical Education Association. (College teachers and administrators of health, physical education, and recreation.)

d. Recommended heads of school departments of physical education.

e. Prominent physical education teachers.

By submitting a check list to all cooperating members of the groups.

Tabulation of returned check lists.

Organization of tabulations into tentative form of standards.

Criticisms of tentative form of standards.

Final standards formulated.

Accepted standards for facilities for health and physical education for boys and for girls in the elementary schools.

Similar procedures are proposed for the junior high school, senior high school (boys and girls), and for college men. Facilities for college women will be studied at some future date.

In replying to various pleas for help on contemplated building programs, the committee has been distributing a select bibliography. The list isn't intended to be all-inclu-

sive. It has been purposely confined to the minimal few sources which have been most helpful in this study to date.

ATHLETIC PLANT

Lamar, Emil: *The Athletic Plant* (Layout, Equipment and Care), McGraw-Hill Book Co., New York, 1938. Detailed specifications for areas and equipment.

Lowe and Campbell, *Field and Court Dimensions*, Kansas City, 1944.

COLLEGE

Evenden, Strayer, and Englehardt: *Standards for College Buildings*, Teachers College Press, New York, 1938. General in facilities. Specific for level.

Houston, Ruth Elliot: *Modern Trends in Physical Education Facilities for College Women*, A. S. Barnes & Co., New York, 1939. Suggestive plans and photographs.

Hughes, William L.: *Administration of Health and Physical Education in Colleges*, A. S. Barnes & Co., New York, 1938. Thorough and complete for the college level.

See Lee (below).

GENERAL REFERENCES

Blair, Herbert: *Physical Education Facilities for the Modern Junior and Senior High School*, A. S. Barnes & Co., New York, 1938. Definite specifications for planning indoor facilities. A very good source.

California State Department of Education, Division of Health and Physical Education: *A Score Card for Evaluating Physical Education Programs for High School Boys, Bulletin No. E-2*, Sacramento, 1931. Outstanding reference for specific standards.

A Score Card for Evaluating Programs for High School Girls, Bulletin No. E-3, Sacramento, 1931. Outstanding reference for specific standards.

Englehardt, N. L.: *Standards for Junior High School Buildings*, Bureau of Publications, Teachers College, Columbia University, 1932. General in facilities. Specific for level.

LaPorte, William Ralph: *The Physical Education Curriculum*, University of Southern California Press, Los Angeles, 1942. Public school provisions. Score card included.

Lee, Mabel: *The Conduct of Physical Education*, A. S. Barnes & Co., New York, 1937. Emphasis upon women's needs.

Nash, Jay B.: *The Administration of Physical Education*, A. S. Barnes & Co., New York, 1930. One of the best public school references for provisions for both sexes.

Strayer, G. D. and Englehardt, N. L.: *Standards for Elementary School Buildings*. Bureau of Publications, Teachers College, Columbia University, 1923. General in facilities. Specific for level.

Standards for High School Buildings, Bureau of Publications, Teachers College, Columbia University, 1924. General in facilities. Specific for level.

Standards for Village and Rural School Buildings of Four Teachers or Less. Bureau of Publications, Teachers College, Columbia University. General in facilities. Specific for level.

Williams, J. F. and Brownell, C. L.: *Administration of Health and Physical Education*, W. B. Saunders & Co., Philadelphia, 1939. Very good for the

total program in public schools. Many specifications.

LOCKER AND SHOWER ROOMS

Bartholomew, Clarence: "Standards for Locker and Shower Rooms," *Journal of Health and Physical Education*, January, 1941, Vol. XII, No. 1, pp. 29-31, 57, 59. Rather complete, specific, concise, empirical standards.

PLAYGROUND AND RECREATION AREAS

Butler, George D.: The National Recreation Association, *The New Play Areas*, A. S. Barnes & Co., New York, 1938. Best of its kind, chiefly on recreational areas.

SAFETY

National Safety Council, Safety Education Series: *Safety in Physical Education and Recreation for Elementary and Secondary Schools*, Chicago, 1941. Concise and helpful.

SURFACES

National Association of Public School Business Officials, "Playground Surfacing," *Bulletin No. 7*, John T. Cate, Pittsburgh, 1940. Splendid source on this topic.

SWIMMING POOLS

Leuhring, F. W.: *Swimming Pool Standards*, A. S. Barnes & Co., New York, 1939. Complete and authoritative on all school levels.

See Hughes (above).
See Williams and Brownell (above).

•

"Here Below"

(Continued from page 5)

long as the distinction exists) or he should be a gifted, broad-gauged or reformed old-timer who long ago saw the place of the parks in a total recreation scheme.

The greatest safeguard to the social integrity of public recreation service lies in the education of tastes, the improvement of the sense of appreciation, the sharpening of the ability to choose wisely.

It is here that education and recreation unite, not to standardize appetites, not to fit people into artificial molds, nor into altitudinous patterns of living, but rather to add to the breadth and the depth of their enjoyment, to introduce them to a fuller life, to raise the quota of satisfactions in living.

Recreation sports — sports for their own sake, for the sheer enjoyment of the participation — must invite on every hand the American boy and girl, man and woman, to find expression or balance or even escape in volleyball or shuffleboard, swimming or skating—whatever he chooses in his own time off the job and to whatever amount he deems necessary to satisfy his own hunger.

There, in a nutshell, is the reason our school facilities should be put on an around-the-clock basis.

. . . and there was light!

(Continued from page 10)

Answer: The comparatively few hours per year during which the average sports and recreation installation is used have given rise to the economical practice of over-voltage operation of lamps. An installation operated 200 hours or less per year should have lamps operated at 10 percent over rated lamp voltage. This increases the light output 35 percent and the power 16 percent.

In this way, the number of floodlights and related equipment required can be reduced by 25 percent, compared with rated voltage operation. Where recreational installations are used 200 to 500 hours a year, five percent over-voltage is advocated. Above 500 hours, rated voltage operation should be used.

20. *How often will lamp bulbs have to be replaced?*

Answer: This depends entirely upon the number of hours the installation is used and whether or not over-voltage is employed in accordance with the suggestions under question 19. Lamps in this service usually have 1000 hours rated life. Therefore, at ten percent over-voltage, approximately 300 hours of life can be expected; at five percent over-voltage the anticipated life might be 500 to 550 hours.

21. *How is over-voltage obtained?*

Answer: The usual and most practical means is by employing transformers with 2½ percent primary taps. This makes it possible to step up the voltage and use standard voltage lamps.

22. *What is meant by narrow, medium and wide angle floodlights?*

Answer: Narrow angle floodlights, as far as sports lighting is concerned, are usually those of 25° or less beam width, medium angles range from 25° to 70°; and wide angle floodlights are 70° and over.

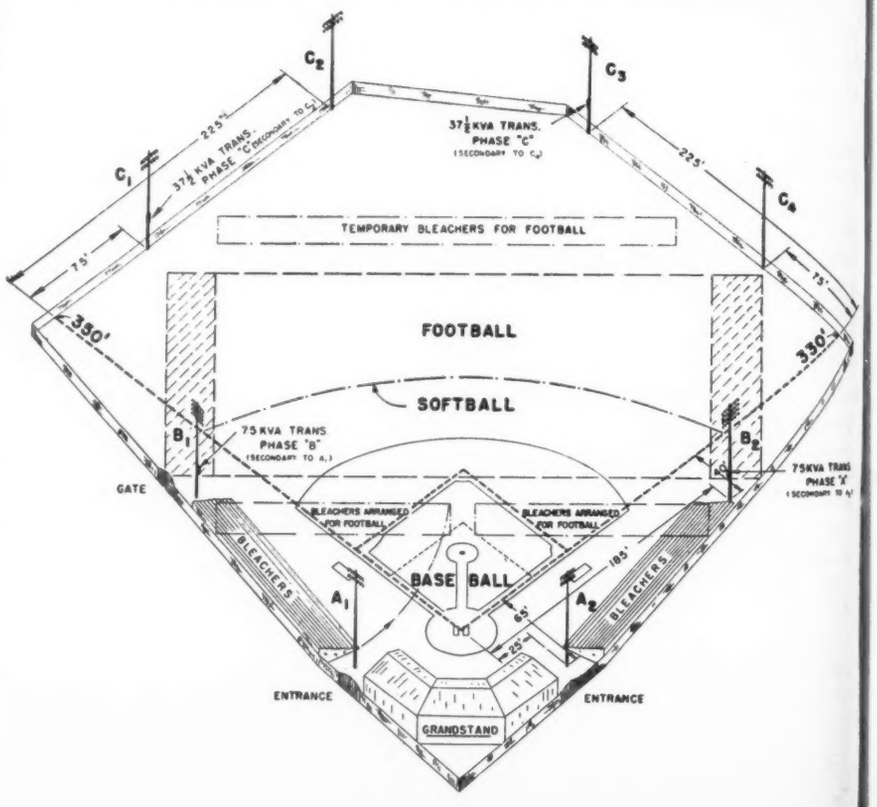
23. *What beam angle width should be used for sports lighting?*

Answer: Most sports applications involving considerable area, such as a baseball field, can best use a combination of medium and wide angle floodlights. Football fields will use either the medium or wide angle, but not in combination. Selection between medium and wide angle floodlights depends upon the distance of the poles from the sidelines.

24. *How are these beam angles obtained?*

Answer: Usually the difference between medium and wide angle beams is simply a matter of using polished aluminum surfaces and etched aluminum surfaces respectively. To obtain beam spreads as narrow as 10° to 20°, special reflector contours and concentrated filament lamps are required.

For $13,000, you can get this combination field lighting system!



25. *How many floodlights are usually mounted on one pole?*

Answer: Usually a single wood pole cannot conveniently mount more than 24 modern sports floodlights. By combining two poles in an H-frame construction, this number can be doubled. This is also true of monotube steel poles. Some modern installations use twin steel poles where more than 24 floodlights are required.

Fabricated steel towers and roof structures can be designed for an unlimited number. For example, one battery of floodlights for the Yankee Stadium lighting will provide for mounting 297 units.

26. *Which are better, wooden or steel poles?*

Answer: Wood poles usually require guying (guy wires to keep them in place). Steel poles are designed for maximum wind loads without guying. Steel poles last longer than wood ones, present a neater appearance, and lend themselves nicely to underground wiring.

27. *How high should the poles be?*

Answer: Earlier we pointed out that visibility depends, among other things, upon adequate mounting height. Keeping the floodlights above the normal line of vision is essential. Mounting heights for various sports are listed in the Table, and vary from 20 to 80 feet.

28. *What safety measures should be incorporated in the poles?*

Answer: Minimum requirements for wooden poles should be climbing steps; safety servicing platforms are advocated both for steel and wooden poles.

29. *What safety precautions should be taken from an electrical standpoint?*

Answer: It is always advisable to fuse branch circuits. Weatherproof distribution boxes are available which will protect each lamp individually, and are recommended for all permanent installations. One worthwhile precaution often overlooked is that of keeping one side of the pole free from obstructions and high-voltage distribution, for ease and safety in climbing the pole.

30. *What other electrical refinements should be considered?*

Answer: Many early sports lighting installations were made on a temporary basis. Electrical and mechanical short cuts lowered the cost but did not make for a wise investment, since the three major cost-saving factors (low mounting heights, temporary overhead wiring,

(Concluded on page 54)

Please send all contributions to this column to Scholastic Coach, Coaches' Corner Dept., 220 East 42 St., New York 17, N. Y.

Among the more fascinating nicknames in sport is that "Two-Towel" moniker someone hung on Bob Kurland, the Aggies 7-ft. hoop dunker. It seems it takes two towels to mop Bob's monstrous frame!

Then there's the one about the coach who made an impassioned plea in the dressing room. Winding it up with "Follow me!" he yanked open the wrong door and fell into the swimming pool, followed by his entire squad.

We've always tolerated cheerleaders as a nauseating but harmless species. Not so Vadal Peterson, Utah U. hoop coach. He'll plug any screamleader that dares set foot on the court. He claims one of them cost him the St. Joseph's game.

Vern Gardner, his 6-4 freshman ace, was in the act of taking a pre-game practice shot when, out of nowhere, an anemic cheerleader came bounding across the court and crashed into him. Gardner went down with a thump and came up with a charleyhorse, which kept him out of the game.

That's the way Peterson tells it. Herb Good, of *The Philadelphia Record,* claims Vadal is guilty of hacking. Gardner, says Good, received his charleyhorse on the way East and started the St. Joe game with his leg heavily bandaged. He was bumped during a scrimmage and pulled up lame, leaving the game early in the second half.

It's a Good story and Peterson is stuck with it.

Bowl-a, bowl-a. Bill Nast, crack kegler, amazed the nation's alley cats last month by rolling successive games of 298 and 300! Bill racked up 11 strikes, then missed. As the crowd relaxed after the 298, Bill went right back to work and never faltered—knocking off 12 bull's-eyes.

When batters in the Ohio State League turn to the umpire next summer and growl, "Why yuh blind bum, you're not even dry behind the ears," they may be stating a fact. That's if Hank McGowan is behind the plate. Hank isn't blind, but he *is* dry behind the ears. Just turned 18, he's the youngest arbiter in the history of organized baseball. He's a senior at Newtown High School in New York.

Has any high school baseball coach turned out more big timers than Colonel E. P. Holt, of the Oak Ridge, N. C., Military Institute? In his 43 years of baseball coaching, he has developed such pro stars as Wes and Rick Ferrell, Chubby Dean, Maxie and Rube Wilson, and many others. President of Oak Ridge for the last 18 years, the Colonel also scouts for the Cleveland Indians.

One of Paul Krichell's most illustrious discoveries was Johnny Broaca, the somewhat eccentric Yale pitcher. Krichell paid Broaca $3,100 to sign a Yankee contract. The Ivy League wonder was unveiled by the Yanks in the second game of a double-header against Washington. Lefty Gomez had won the opener, 1-0, in 11 innings. Krichell was seated with Colonel Ruppert, Ed Barrow and George Weiss in the Yankee royal box, nervously sweating out the debut of his protege.

Broaca walked the first batter. And the second. And the third. He had three balls and no strikes on the fourth batter when an usher tapped Krichell on the shoulder. "Lefty Gomez wants to see you, Mr. Krichell, down in right field," said the usher. "Says it's very urgent."

From the royal box at Yankee Stadium, in the mezzanine on the third-base side, to right field in the lower stands is a long hike. But Krich made it in nothing flat, keeping an eye on Broaca all the way.

"What's the matter?" he demanded of Gomez.

"Look at all those horse collars on the board," murmured El Goofy blandly, pointing to the inning score of the first game. "Don't you wish you had discovered me instead of this Broaca?" (Thanks to Tom Meany in his *Sat. Eve. Post* piece, "Chorus Men of Baseball.")

To the utter surprise of teacher, the dullest boy in the class raised his hand when she asked: "Can anyone tell me where Cincinnati is?" Nodding to the boy she said: "All right, Chick, you may answer."

"Cincinnati," vouchsafed the lad, "is playing in New York."

One record the Pacific Coast Baseball League never brags about is the mark for least attendance. Several years ago threatening weather and intermittent showers kept a "crowd" to one paid admission. Whereupon the plate umpire turned and addressed the stands:

"Dear *sir,* the batteries for today's game are . . . "

Sportsmanship with a capital S: Up in Canada, Rex Wiggins, a cross-country runner of McGill University, noticed that a visiting competitor leading him in the Eastern Canada championships was making a wrong turn. Wiggins yelled to him, putting him on the right track. Wiggins lost the race, but won an army of friends.

Jack Kirkwood, the radio man, boasting of his prowess as an ice skater, told how he had mastered the art of cutting figure eights. "Why," claimed his sponsor, "that's the simplest thing on ice."

"Not the way I do it," retorted Kirkwood. "I make five with one foot and three with the other!"

Weirdest play of the past grid season came in the third quarter of the UCLA-California game. With the Bears in

possession on its own 34, Lerond dropped back for a quick kick. The ULCA forwards slithered through and partially blocked the punt. But the Bear quarter, Welch, scooped it up, evaded a flock of Bruin tacklers and broke past the scrimmage line.

He was joined by a mass of blockers, including Lerond, the kicker. Welch lateraled to Lerond and the receiver went for a touchdown—scoring on a play netting 74 yards from the point where his blocked kick was recovered!

That was routine stuff compared to a play in the 1933 Giants-Bears game. Harry Newman, the Giant quarterback, sent Ken Strong into the line, feeding him the ball from up close. Strong dove in—and bounced back. He pivoted around and saw Newman lazily watching the play, hands on hips. Strong promptly lateraled back to him.

Newman, flabbergasted, lit out to his left. Strong, having nothing better to do, sauntered into the end zone. Meanwhile Newman was having his trouble. With a herd of Bears bearing down upon him, he circled back, frantically looking for a way to unload the hot potato. Spotting Strong in the end zone, he lifted his arm and fired a strike for a t.d. That's the stuff pro ball is made of.

A couple of kids, playing football in a vacant lot, kicked the pigskin into a nearby chicken yard. The rooster, puzzled, sidled up to it. Firmly convinced of what he saw, he ran over to the hen house and stuck his head in the door.

"Hey, you gals," he cackled, "think you're pretty hot, eh? Well get a load of what they're turning out in the next yard!"

Remember Sammy Slaughter, th so-called fighter? A beautiful hunk man, he just didn't have the heart f the game. To bolster Sammy's morale his manager, "Mr." Hahn, fixed a bou But the opponent pulled a double cross.

At the bell, he rushed out and tagge Sammy on the bread-basket. Sammy hit the canvas. Hahn promptly screamed "Foul!" dragged Sammy t a corner, and whispered: "Fall off the stool; collapse, and they'll give you the nod." But Sammy merely shook his head. A doctor then examined Sammy. Although he couldn't see any evidence of a foul, he recommended a short rest.

The bell rang again and this time the opponent, took no chances of a foul. He gave it to Sammy flush on the button. Down went Sammy on his head again. Two knockouts in less than 20 seconds.

On the way home, Sammy was moody. His manager kept chattering to him, figuring that Sammy might not believe he had been double-crossed to and might swing on him. Sammy didn't say a word all the way home. But when they pulled up at the hotel, he kind of shook himself and spoke:

"Mr. Hahn," he said, "get him for me again, will you? I'll fight that bum on the level next time."

Talk about wide open games. In the Cotton Bowl on Jan. 1, Missouri rolled up 22 first downs and 514 yards passing and running. Texas gained 40 yards for 19 first downs. The Longhorns staged 75, 60, 69, 74, 80, and 6 yard t.d. drives, while Missouri rolled 80, 62, 94, and 80 for its scores. Texas, as you undoubtedly know, won, 40-27. Imagine losing a game after piling up 22 first downs and 514 yards gained!

"... and there was light!"

(Continued from page 51)

and inexpensive floodlights) had to be replaced.

Underground wiring and permanent secondary branch circuit wiring should be regarded not only as justifiable from the standpoint of permanence, but also as a safeguard against accidents and failures.

31. *How do overhead and underground wiring compare in cost?*

Answer: By taking advantage of all the benefits and convenience afforded by underground wiring and by complete assembly of floodlights on steel poles, together with all branch circuit wiring, before being raised into position, almost all the additional cost of underground wiring can be saved.

32. *What flexibility should be contemplated in the electrical control of a lighting system?*

Answer: Either primary or secondary control of all poles of a system, other than a system depending upon all poles for successful operation (such as tennis courts), should be provided. This makes it possible to light half a football field for practice purposes only or for playing softball on that portion of the field.

33. *What is the most efficient manner of adjusting the floodlight beams on the field?*

Answer: Aiming charts are available from the floodlight manufacturer. Modern sports floodlights have horizontal and vertical degree marking scales for ease and accuracy of adjustment.

This type of floodlight also has vertical repositioning stops so that after servicing, the floodlight can always be returned to its original setting. (It is seldom if ever necessary to disturb the original horizontal setting in servicing.)

Care of Equipment the Year 'Round

(Continued from page 34)

Laundering. Some pieces of equipment, such as socks, undershirts, and supporters, should be laundered more frequently than other garments. Laundering of above pieces should be done at least once a week, and oftener if possible. All garments after being laundered should be checked for repairs before being re-issued. Repairs should be made at once. All woolen jerseys should be dry-cleaned or washed in lukewarm water after every game.

Money used in this manner is well spent, because it prevents the spread of contagious skin diseases. Frequent cleaning also prolongs the life of the garments. Remember, dirt and grit are harmful to fabrics.

Daily inspection. All jerseys and other such items should be hung on coat hangers to facilitate proper drying. This facilitates checking for holes and rips in the fabric. Urge players to report immediately all equipment that is in need of repair. This should be done daily, and repairs made before re-issuing.

In order to replace quickly items in need of repairs, a sufficient supply of duplicate equipment should be kept on hand. This facilitates replacements until repairs can be made to damaged pieces. The items should be returned to shelves as soon as repaired.

Game equipment. Game equipment, such as balls, should be checked before and after every practice and game. Any break on a ball should be taken care of immediately. Where flaws due to imperfect workmanship are noticed, it is wise to send them back to the manufacturer for replacement.

Prior to every game, several balls should be inflated according to official specifications. This will enable the referee to select the one he deems fit for the game. The others should be placed in a bag and put in charge of a student manager on the bench in case of emergency. Many games have been held up because of negligence in this matter.

Players should be instructed to return all equipment issued to them the day after the close of the season. This is more important today than at any other time, because lost equipment is difficult to replace. This should be impressed upon the boys, along with other instructions when issuing equipment. All items returned should be checked against personal-permanent file.

Following the check-in, the equipment should be carefully inspected to determine what should be discarded, cleaned, repaired, and laundered.

All equipment that can be used for the next season—and most of it will have to be used—should be handled as follows:

SHOES

1. Cleaned, repaired and waxed.
2. Old cleats and laces replaced with new.
3. Shoe trees inserted to preserve shape.
4. Do not stack shoes upon each other.

PANTS

1. Sent to cleaners.
2. Leather patches waxed.
3. Felt pads examined, and replaced with new ones if necessary.
4. New laces.

JERSEYS (Woolen)

1. Send to cleaners.
2. Repair as needed.

3. Necessary moth preventive measures.

STOCKINGS (Woolen)

1. Send to cleaners.
2. Repair as neded.
3. Necessary moth preventive measures.

HELMETS

1. Clean with saddle soap.
2. Check chin straps and other injury-preventive straps inside helmet, and replace with new ones if necessary.
3. Paint leather with lacquer.
4. Wire-head forms placed inside each helmet to keep shape. These can be made in school shops.

UNDERSHIRTS (Cotton)

1. Send to laundry with instructions to wrap carefully.
2. Store away securely wrapped.

BALLS

1. Wash with saddle soap.
2. Apply thin coat of wax.
3. Store in dry, cool dark room if possible.

TRACK EQUIPMENT

Metal shots—clean with sand paper, oil, and store.

Discuses—clean and shellac.

Jumping and vaulting standards—repair, if necessary; paint, and store away.

Steel tapes — clean with gun emory paper; wipe thoroughly; oil and store in supply cabinet.

Vaulting poles—clean and shellac; place in rack and store in dry room that is not too warm.

Hurdles—repair as needed; paint and store. Be sure all bolts and metal parts are painted to prevent rusting.

Baseball bases can be made to last longer if they are kept clean and brought in every evening. Keep out of rain. Paint with a good canvas paint.

Remember, properly-nursed equipment lasts longer, saves taxpayers money, and enables your department to purchase other equipment from year to year that will be needed to conduct a well-rounded program in physical education, intramurals, and interscholastic athletics.

Baseball and softball bats, golf clubs, racket frames and hockey sticks deteriorate from the effects of moisture. Every six weeks, all wooden equipment should be coated with protective spar varnish. Javelins, vaulting poles and racket frames should be hung up to prevent warping. At the first indication of injury, articles should be immediately repaired.

Touchdown Turf!

(Continued from page 32)

as a substitute for fertilizer. No matter how much of it is used, the grass will still require ample supplies of nitrogen and other fertilizer components to produce a satisfactory growth. The use of lime exclusively or in excess tends to encourage white clover, which makes a slippery turf ill-suited for athletic fields.

Any turf subjected to heavy play is certain to be scarred badly in some areas and worn thin over much of it. The most common method of repair is resodding. It must be remembered, however, that the type of play which wears down old established grass is especially severe on delicate seedlings of the same species.

For that reason, any treatment such as fertilizing, which encourages a more vigorous growth of the established **old plants, is** likely to be more successful than reseeding.

When to seed

The seeding should be done when climatic conditions are most favorable to the development of seedlings. In the North, the best time is late August and September. Second choice is late March and April. In the South, the best seeding time is spring.

Unfortunately, these favorable seeding **seasons coincide** or just precede the periods of greatest athletic activity. The tender seedlings are, therefore, exposed to extreme abuse during the time they are struggling to become establishd.

Seeding at unfavorable seasons only adds to the handicap. Most seedlings, at best, are doomed to a short life on fields of heavy play. Repeated reseeding at favorable seasons may provide some general improvement, where maintenance is good.

If another practice area is available, it is a wise idea to use it while the grass on the regular field is taking root. If you know you're going to reseed in the fall, schedule the first football game away from home. This will give the seedlings additional time to flourish.

Whenever possible, the reseeding should be done with disk reseeders. Placing the seeds in shallow grooves affords protection against foot traffic.

One of the most common causes for failure of turf is extremely close

mowing. Many maintenance men make the mistake of regarding all turf the same as that on golf courses.

They're oblivious of the fact that golf turf is mowed too closely for the health of the grass. The requirements of play on a course are quite different than on athletic fields. That's why the grass must be cut closer. Not because it's healthier for the grass.

Several years ago, the author recommended a much higher cut of grass on the fields at West Point. The mowers were raised accordingly to 2½ to 3 inches. That season the football coach reported a noticeable decline in injuries, particularly around the shoulder.

A longer grass develops more vigorously than a closely mowed one and will withstand much more abuse. The resulting heavy cushion may make the field a little slower, but it will provide softer landing areas for the players.

Any treatment easier on both the surface and the players certainly commands a fair trial.

Water, water

Water is a great aid to turf development. It should be applied liberally so that it wets the ground to a depth of at least 2 to 3 inches.

Athletic fields should be watered only when the ground is dry. Frequent light sprinkling, as on putting greens, isn't too beneficial. It tends to encourage a shallow-rooted weak turf which is unable to stand much wear and tear.

In general practice, turf suffers more from over-watering than under-watering. A good time to water the field is during the evening, but it may be done any time of day.

Sprinklers often throw too much water for packed soil to absorb readily. It is therefore advisable to turn them on for 25 to 30 minutes at a time, with ½ to 1 hour rest intervals between applications to permit the water to penetrate the soil. This prevents excessive soaking of low areas and inadequate penetration of slightly high areas.

After a dry period, it is a good idea to water turf immediately following a light shower which wets the surface to a depth of ¼ to 1 inch. A liberal sprinkling at this time greatly amplifies the benefits of the shower.

Caretakers who heed these few simple instructions will be repaid with a strong, durable turf.

Remember, turf is a *living* material. Nurture it, accordingly, and you will get long life out of it.

New Books

OFF-THE-JOB LIVING. By G. Ott Romney. Pp. 232. New York: A. S. Barnes & Co., $2.75.

IN this superbly projected volume, G. Ott Romney, erstwhile football coach who is now one of the nation's foremost authorities on recreation, offers a modern concept of recreation and its place in the post-war world.

He bids each person give attention to his off-the-job living and to the education of his tastes. He also challenges society to acknowledge its obligations and to provide public recreation just as it provides public education, safety, health and sanitation.

A splendid, down-to-earth writer, Romney supplements his theses with warm, interesting anecdotes culled from the armed forces, public recreation agencies and the sports field.

Outstanding chapters include: Human Hunger Demands Satisfaction, Recreation—a Way of Life, A Community Responsibility, Education of Tastes, Recreation Goes to War, Recreation in Specific Fields, and Where From Here?

Anybody who has anything to do with recreation will find a lode of reading pleasure and practical aids in this volume.

FOOTBALL: FACTS AND FIGURES. By Dr. L. H. Baker. Pp. 732. Illustrated—photographs and tables. New York: Farrar & Rinehart, Inc. $5.

EVERYBODY who loves football, who deals with it in any way, should fly, not run, to the nearest ink bottle. Order *Football: Facts and Figures* right away. It's a dream; the shangrila of reference sources.

Compounded in 732 fact-ful pages are over 75 years of football history. Words fail in describing its scope. To give it a try:

The book is organized in seven broad sections. After a short pre-intercollegiate history of the sport, Dr. Baker gets down to gold-tacks.

In Section 2, "The Players," he gives you the great players of all time, the greatest backfields of the greatest teams, the longest passes, the leading passers and receivers, the runners, the rushing leaders 1937-44, the longest runs, punters and punting, the blockers, all the all-America teams, modern individual records, and season high scorers!

In Section 3, you'll find the great coaches.

Then comes a voluminous section on major college teams. The author details the records of 63 major grid powers.

He gives you the team's bowl record, best and worst seasons, largest and lowest scores, longest undefeated cycle, prominent coaches, all-Americans, captains, leading players through the years, all-time player squad, and major dual series scores.

Section 5 is devoted to the important rules changes over the years, modern basic formations and a chronology of famous plays.

In Section 6, you'll find the history and complete record of all bowl winners.

Section 7 is given over to miscellanea—point-a-minute teams, jinxes, famous firsts, history of changes in uniforms, catch phrases, awards and trophies, unbeaten-untied teams, leading teams 1869-1944, the conferences and stadium capacities.

Section 8 dips into professional football—history and records.

Dr. Baker is supposed to own the largest library of footballania in the world. His book goes a long way toward proving it. It's the most amazing literary feat since *Gone With the Wind.*

MODIFIED ACTIVITIES IN PHYSICAL EDUCATION. By Doreen Foote. Pp. 101. Illustrated—drawings. New York: Iona Publishing Co., Inc. $2.

WITHIN the field of corrective physical education lies a frequently neglected group of pupils—the over and the under weight, the heart cases and the physically and mentally handicapped. Because many teachers do not know what to do with them, they are frequently left out of planned programs.

Miss Foote, a physical education instructor at Long Beach, Cal., offers suggestions that have not been collocated in any other book, for teachers of these remedial groups.

In addition to classifying the modified activities and presenting ideas on organization and procedures, she offers an excellent program on such informal activities as shuffleboard, bowling, clock golf, archery, checkers, marbles, tetherball, rope spinning, riflery, bait casting, and many others.

She also presents individual chapters on hobbies, camping skills, posture correction activities and rhythms. Rules, equipment and coaching hints are given for each activity.

While aimed at teachers of handicapped groups, the book has much to offer the "regular class" instructor as well. Its suggestions can enrich any program of physical education.

1945 CONVERSE BASKETBALL YEAR BOOK. Pp. 50. Illustrated—photographs and diagrams. Malden, Mass.: Converse Rubber Co. Free.

THE 24th annual addition of the Converse yearbook is a lollapalooza. Chockful of interesting team pictures and records, it also contains "Chuck" Taylor's all-America team, Dick Dunkel's team ratings for the past season, and a wealth of helpful technical articles.

W. Harold Anderson gives you Bowling Green's offense; Howie Bollerman writes on defensive and offensive tactics; Lawrence "Pops" Harrison offers a treatise on offense; Hank Iba shows you how he builds his

Oklahoma A. & M. teams; and Paul Jenkins describes how the fast break pays off.

For your free copy, write to Dept. SC, Converse Rubber Co., Malden 48, Mass.

HOW TO PLAY WINNING BASKETBALL. By Adolph Rupp. Pp. 20. Illustrated—diagrams and drawings. Chicago: The Quaker Oats Co. Free.

HERE'S another swell little gift package, teeming with helpful technical information on every phase of basketball.

The famous University of Kentucky coach tersely and succulently covers: passing, shooting, pivot shots, individual skills, screening, man-to-man defense, defensive strategy, fundamental drills, zone defense, attacking a zone, strategy, the figure 8, single pivot offense, double pivot offense, special plays, and fast breaks.

In a special supplement, Grace P. Boyce, Hunter College coach, offers a technical analysis of fundamentals and plays in the girls' game.

Coaches may obtain copies of this booklet for their squads, by checking the Quaker Oats' listing in the Master Coupon on page 48.

Official guides

NEWLY released official guides, selling for 50¢ each, include:

The 1946 N.C.A.A. Boxing Guide, edited by Dr. Carl P. Schott.

The 1946 N.C.A.A. Ice Hockey Guide, edited by David A. Tirrell.

The 1946 U.S. Volley Ball Assn. Volley Ball Guide, edited by Dr. George J. Fisher.

The 1945 N.C.A.A. Soccer Guide, edited by Douglas Stewart.

Each guide contains many team pictures, reviews, technical articles, and the rules. Order from A. S. Barnes & Co., 67 W. 44 St., New York 18, N. Y.

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BASKETBALL RECORDS

High school season scoring record: 1000 points (1921-22) by Bobby Thompson of Passaic (N. J.) High.

High school career scoring record: 2,702 points by Dwight Eddleman of Centralia (Ill.) High, 1938-42.

High average for girls: Iris Spencer, of Wyoming, Pa., scored 1,089 points in 1925-26 (53 points a game).

Longest game: Wenona and Toluca High School of Illinois, 1930. Played 10 overtime periods, Wenona winning, 28-23.

Longest winning streak: 159 games in row. Passaic (N. J.) High School.

Team record for season: Renaissance Big Five, world's champion pro team, won 79, lost 0, in 1933.

Most points in major college game: 53 by George Mikan, De Paul, against Rhode Island State, 1945.

Free Throws: 599 in row by Bunny Leavitt, Chicago.

Most pay: $20 per minute, paid to Hank Greenberg by Brooklyn Jewels pro team, 1934.

FOOTBALL RECORDER

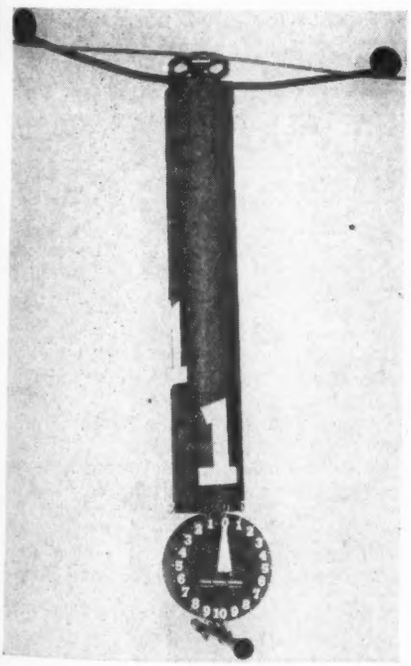
"WHAT is it?" Thousands of football fans who attended the state high school all-star football game at Minnesota's Memorial Stadium early last fall asked that question.

Upon entering the stadium, they were amazed to see a black metal cylinder, four feet long and about five inches in diameter, hanging from a wire stretched ten feet above the ground along one entire sideline.

At the opening kick-off, the owner and inventor of the device, Louis Thayer, of Minneapolis, pushed the object, officially known as the Thayer Football Recorder, along the wire to the spot where the man returning the kick was downed. From that point on, Thayer followed the ball for the entire game.

Sighting through a telescopic lens at the bottom of the instrument, Thayer was able to record the position of the ball at all times. Whenever a close decision over a first down had to be made, he squinted through his lens, and was able to give an accurate reading as to whether or not the necessary yardage had been gained.

The chain-handlers, who ordinarily rush onto the gridiron whenever a first down is in doubt, spent



. . . and here it is, **the Thayer measuring device: On top is the trolley wire on which the instrument is suspended; then comes the long four-windowed down marker, the measuring dial and the magic-eye recorder itself (under dial at bottom).**

SCHOLASTIC COACH
MASTER COUPON

Readers of *Scholastic Coach* may use this convenient form to obtain free literature and sample goods from *Scholastic Coach* advertisers. The offers listed are self-explanatory. For further details refer to the advertisement; the page number is given in parentheses next to each advertiser. After carefully checking items desired, mail this coupon directly to Scholastic Coach Advertising Department, 220 East 42 Street, New York 17, N. Y.

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☐ Tuss McLaughry's Poster, "Condition Pays" How many .....

AMERICAN HAIR & FELT (58)
☐ Names of Concerns Who Can Supply You

AMERICAN WIRE FORM (54)
☐ Folder on Checking and Locker Baskets

A. S. BARNES (47)
☐ Sports-Books Catalog

BIKE WEB (21)
☐ Information on Tensor Elastic Bandages

BROOKS SHOE (57)
☐ Information

CHAMPION KNITWEAR (61)
☐ Catalog

JOHN T. CORE (50)
☐ Information on Score Cards

CROUSE-HINDS (33)
☐ Bulletins on Standard Plans for Lighting Baseball Football, Softball Fields

C. R. DANIELS (29)
☐ Catalog on New Line of Football, Baseball, Softball, Gym and Field Equipment

DENVER CHEMICAL (53)
☐ Handbook, "Athletic Injuries"

M. DUCOMMUN (57)
☐ Information on Stop Watches

EAGLE REGALIA (54)
☐ Information on Sport Pins and Buttons, Medals, Flags, Banners

GENERAL MILLS (41)
See ad for offer of booklet, "Want to Be a Basketball Champion?"

GRISWOLD & NISSEN (50)
☐ Booklet, "Tips on Trampolining"

HILLERICH & BRADSBY (55)
☐ Famous Sluggers Year Book
☐ Softball Rules Book

HILLYARD SALES (35)
☐ Catalog on Floor Treatment and Maintenance
☐ Basketball Chart and Scorebook

HOOD RUBBER (39)
☐ Basketball Foul Shooting Chart — How Many?

HORN MFG. (37)
☐ Information on Folding Bleachers and Partitions

HUNTINGTON LABS. (Inside Back Cover)
☐ New Seal-O-San Basketball Coaches' Digest

JOHNSON & JOHNSON (27)
☐ Information on Athletic Supporters

KAHNFAST ATHLETIC FABRICS (48)
☐ Addresses of Nearest Uniform Makers

KING SPORTSWEAR (6)
☐ Information

BRADLEY M. LAYBURN (50)
☐ Information on Gym and Playground Apparatus, Portable Bleachers

LEAVITT CORP. (49)
☐ Information on Bleachers, Grandstands, Stadiums

LINEN THREAD (Inside Front Cover)
☐ Catalog on available nets

MacGREGOR-GOLDSMITH (24-5)
☐ Sports Catalog

MARBA SYSTEM (60)
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FRED MEDART (19)
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☐ Catalog on Telescopic Gym Seats, Steel Lockers
☐ Catalog on Basketball Backstops, Scoreboards

C. V. MOSBY (60)
☐ Sports Booklist

MOTION PICTURE BUREAU (58)
☐ Information on Film, "Play Volleyball"

MUTUAL LIFE (38)
☐ Aptitude Test

(Numbers in parentheses denote page on which advertisement may be found)

SEE PAGE 64 FOR OTHER LISTINGS AND FORM FOR SIGNATURE

SCHOLASTIC COACH MASTER COUPON

(See page 63 for other listings)

(Numbers in parentheses denote page on which advertisement may be found)

NATIONAL SPORTS (48)
- ☐ Catalogs: Bases, Mats, Rings, Training Bags, Wall Pads, Pad Covers

NEVCO SCOREBOARD (64)
- ☐ Information on Football Scoreboards

NOCONA LEATHER (4)
- ☐ Information

O-C MFG. CO. (55)
- ☐ Information on Apex Athletic Supporter (See ad on how to obtain Free Supporter)

OCEAN POOL SUPPLY (62)
- ☐ Information on Trunks, Klogs, Kicka Boards, Nose Clips, Caps

OREGON WORSTED (54)
- ☐ Information on Flying Fleece Recreation Balls

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PETERSEN & CO. (54)
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- ☐ Folder on Grid-Eye Measuring Device

PRENTICE-HALL (60)
- ☐ Sports Booklist

QUAKER OATS (45)
- ☐ "How to Play Winning Basketball" by Adolph Rupp How Many .....
- ☐ Poster, How to Keep Fit for All Sports

RAWLINGS (3)
- ☐ Basketball Catalog

REGALIA MFG. (60)
- ☐ Catalog and Price List on Flags, Plaques, Emblems

REVERE ELECTRIC (46)
- ☐ Sports Bulletin

JOHN T. RIDDELL (43)
- ☐ Catalog on Shoes, Basketballs, Plastic Football Helmets

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- ☐ Information

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- ☐ Floor Manual

SPALDING & BROS. (1)
- ☐ Catalog
- ☐ Sports Show Book

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- ☐ Information on Infra-red Ray Lamp

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- ☐ Information

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- ☐ "Basketball—Individual and Team Offense" by John Lawther How Many .....

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- ☐ Information on Pyra-Seal Floor Finish

VOIT RUBBER (23)
- ☐ Catalog on Rubber Covered Athletic Balls and Equipment
- ☐ Illustrated Price List

WAYNE IRON WORKS (56)
- ☐ Catalogs on Portable, Gymstand, Permanent Grandstands

WILSON (17)
- ☐ Your copy of "The Human Machine at War"
- ☐ Catalog

WINTARK (2)
- ☐ Catalog on Sports Balls

NAME _____ **POSITION** _____
(Principal, coach, athletic director, physical director)

SCHOOL _____ **ENROLLMENT** _____

CITY _____ **STATE** _____

No coupon honored unless position is stated January, 1946

the afternoon on the sidelines. Th resulted in fewer official times-ou and a general speed-up of the gam

The principle of the recorde simple. Thayer has combined a ular cross-hair gun sight, gea from a machine which measure rope and wire fibres, and a tele scopic lens to produce a device whic gives a far more accurate position o the ball than the pointed stick which has been in use for so many decades.

By sighting through the telescop and lining up the front of the ball with the hair-line indicator, a very accurate reading can be obtained.

When the ball is lined up with the sight, a measuring dial records the yardage gained or lost. The down marker has four windows in which each number can be seen from any position on the field. With the o four-sided box, those in front see No. 1, in back No. 3, on the sides No. 2 and No. 4.

Mounted on a carriage, the instrument travels the full length of the field on a cable 360 feet long.

A permanent set-up for the position marker has been constructed at St. Paul's Central Stadium. Steel posts set in concrete have been installed at both ends of the field and a taut wire stretched between the posts.

It is here that the recorder shows at its best, because there is absolutely no sag in the wire. By next fall, several Twin City high schools will have installed permanent fixtures for the football recorder.

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SUM ALL-AMERICA TEAM

HERE you are, men, the super all-America football team of 1945, picked for you by hundreds of experts all over the country.

We took the six best all-star elevens —laid 'em side by side and counted schnozzles. The players who got the most votes in each position became our super team.

Ends: Duden, Navy; Bechtol, Texas.
Tackles: Coulter, Army; Savitsky, Penn.
Guards: Amling, Ohio State; Green, Army.
Center: Mancha, Alabama.
Backs: Fenimore, Oklahoma A. & M.; Davis and Blanchard, Army; and Wedemeyer, St. Mary's.

Three players were picked by everybody—Amling, Davis and Blanchard.

Five others missed 100% by just one vote—Duden, Coulter, Green, Savitsky, and Wedemeyer.

Army ran away with the team honors. Four Cadets made our first team; two others received mention (Nemetz and Foldberg). Army has now won 18 straight games over the past two seasons. In that time, they have scored 916 points to their opponents' 81!